Intel® Server Board SHG2 Product Guide

A Guide for Technically Qualified Assemblers of Intel® Identified Subassemblies/Products

Order Number: A90327-003

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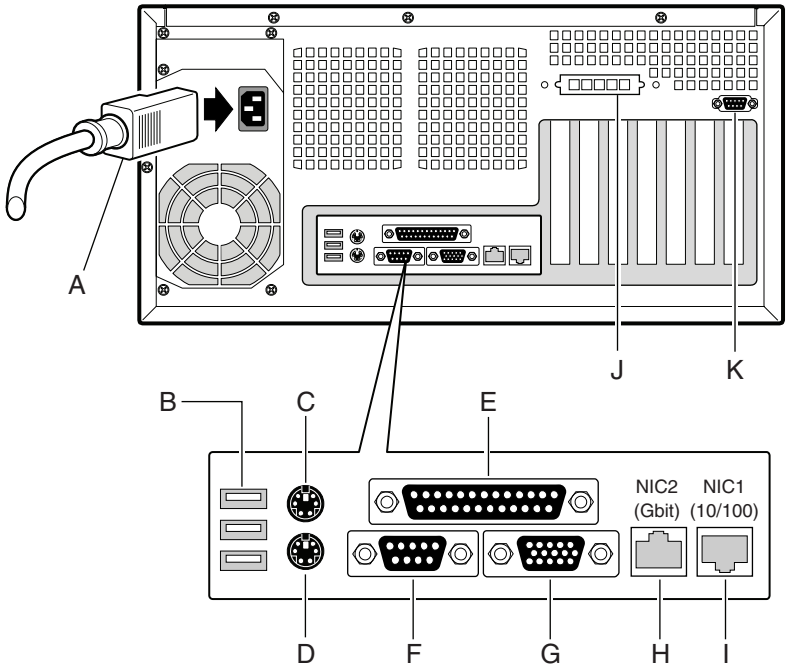
1 Description

Server Board Features

Table 1. Server Board Features

Feature	Description
Processor	Up to two 1.8 GHz to 2.4 GHz Intel® Xeon™ processors with 512K cache support packaged in a 603-pin micro Pin-Grid Array (PGA)
System Bus Frequency	400 MHz Front Side Bus
Memory (DRAM)	Six 72-bit sockets for 184-pin, 200 MHz, 2.5 V, DDR200 or DDR266 compliant, registered, ECC, SDRAM single-sided or double-sided memory modules (DIMM)
Video Memory	8 MB SDRAM of video memory
PCI bus	• One PCI-X 133 MHz/64-bit 3.3 V full-length expansion slot for an add-in board (see "Enabling PCI-X on Slot 6 and Disabling On-board SCSI" on page 90) • Two PCI-X 100 MHz/64-bit full-length expansion slots • Three standard PCI 33 MHz/32-bit full-length expansion slots for add-in boards
Graphics	Integrated onboard ATI Rage† XL 32-bit SVGA controller
SCSI	Adaptec† AIC-7899W dual channel Ultra160 SCSI, supporting onboard Ultra 2 (LVD) wide, Ultra-wide, and Ultra160 SCSI interfaces
Network	Two integrated onboard Network Interface Controllers (NICs): • An Intel® 82550PM single-chip PCI LAN controller for 10Base-T/100BaseTX Fast Ethernet networks • An Intel® 82544GC single-chip Gigabit Ethernet Controller capable of providing 10/100/1000 Mbps data rates Two RJ-45 Ethernet connectors at the I/O back panel
System I/O	• PS/2†-compatible keyboard and mouse ports, 6 pin DIN • IEEE 1284-compliant, 25-pin, bi-directional parallel port • VGA video port, 15-pin • Two serial ports, one 9-pin on the rear I/O and one through a 10-pin header on the baseboard • Two RJ-45 Ethernet ports • Four USB ports, three on the rear I/O and one through a 10-pin header on the baseboard
Form Factor	Server ATX form factor, ATX 2.03 compliant I/O SSI Entry E-Bay 3.0

Back Panel Connectors

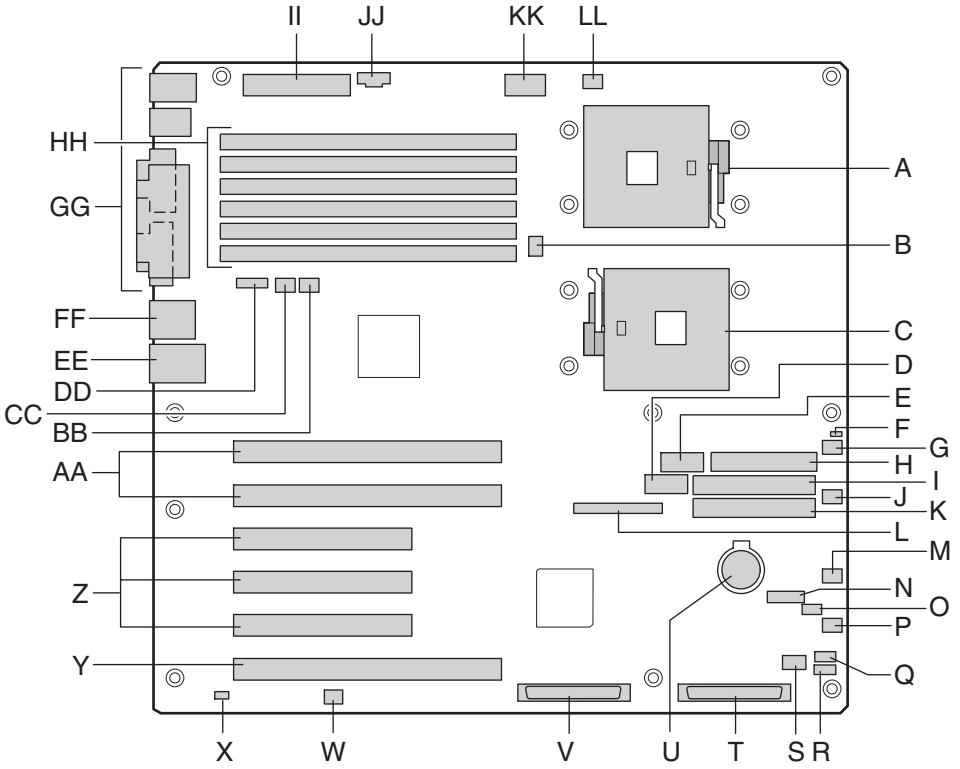


A	AC Power*	G	Video
B	USB 1, 2, 3	H	NIC2 (Gbit)
C	Mouse	I	NIC1 (10/100)
D	Keyboard	J	ICMB/External SCSI Connector Knockout*
E	Parallel Port	K	Serial B Knockout*
F	Serial A		

* Intel® SC5200 Base chassis shown here. Item may be different on your chassis.

Figure 1. Back Panel Connectors

Server Board Connector and Component Locations



A	Primary Processor Socket (CPU1)	T	LVD SCSI B
B	CPU2 Fan	U	Battery
C	Secondary Processor Socket (CPU2)	V	LVD SCSI A
D	Front Panel USB	W	Jumper block CN53
E	Serial B	X	Chassis Intrusion
F	Jumper Block CN27	Y	PCI-X 64-bit/133 MHz
G	System Fan 5	Z	PCI 32-bit/33 MHz
H	Floppy disk drive connector	AA	PCI-X 64-bit/100 MHz
I	Secondary IDE	BB	System Fan 1
J	System Fan 6	CC	System Fan 2
K	Primary IDE	DD	ICMB
L	Front Panel connector	EE	NIC1 (10/100)
M	IPMB	FF	NIC2 (Gbit)
N	Jumper Block CN43	GG	System I/O connectors
O	System Fan 3	HH	DIMMs
P	System Fan 4	II	Main Power
Q	HSBP B	JJ	Aux Sig
R	HSBP A	KK	+12 V CPU Power
S	HDD LED Connector	LL	CPU1 Fan

Figure 2. Server Board Connector and Component Locations

Processor

The Intel® Server Board SHG2 supports one or two Intel Xeon processors from 1.8 GHz to 2.4 GHz, with 512 KB of L2 advanced transfer cache packaged in a 603-pin micro-PGA (Pin-Grid Array).

When two processors are installed, both processors must be identical. When only one processor is installed, the processor must be installed in the CPU1 socket, which is the socket closest to the corner of the server board.

For a complete list of supported processors, see:

http://support.intel.com/support/motherboards/server/SHG2

Memory

The Intel Server Board SHG2 contains six 184-pin DIMM sockets. Memory is partitioned as three banks. DIMMs must be populated in identical pairs.

The SHG2 server board supports up to six 2.5 V, ECC, DDR 200 or 266-compliant, registered SDRAM 184-pin gold DIMMs. A wide range of DIMM sizes are supported, including 128 MB, 256 MB, 512 MB, 1 GB, and 2 GB DIMMs. The minimum supported memory configuration is 256 MB, using two identical 128 MB DIMMs. The maximum configurable memory size is 12 GB using six 2 GB DIMMs.

The SDRAM interface runs at a frequency of 200 MHz; however 266 MHz memory can be used. The memory controller supports 2-way interleaved SDRAM, memory scrubbing, single-bit error correction and multiple-bit error detection with Chipkill† capability that allows the system to continue to run even in the event of a multi-bit SDRAM failure.

Memory can be implemented with either single-sided (one row) or double-sided (two row) DIMMs.

✏ NOTE

Use DIMMs that have been tested for compatibility with the server board. Contact your sales representative or dealer for a current list of approved memory modules. Check the Intel Customer Support website for the latest tested memory list:

http://support.intel.com/support/motherboards/server/SHG2

Add-in Board Connectors

The server board has the following add-in board connectors:

- Two 184-pin full-length, 3.3 V, PCI-X 64-bit/100 MHz connectors.
- Three 120-pin full-length, 5 V, standard PCI 32-bit/33 MHz connectors.
- One 184-pin full-length, 3.3 V, connector that is capable if PCI-X 64-bit/133 MHz operation. To enable PCI-X 64-bit/133 MHz operation, you must disable the onboard SCSI controller using BIOS Setup. See page 57 for more information on using BIOS Setup. The default operation of this connector (slot 6) is PCI 64-bit/66 MHz operation.

Video

The system has an integrated ATI Rage XL 32-bit high-performance SVGA subsystem that supports the following:

- BIOS compatibility with all standard VGA modes
- 8 MB of video memory
- Pixel resolutions up to 1600 x 1200 pixels per inch (ppi) in 8/16/24/32 bpp modes under 2D and up to 1024 x 768 ppi in 8/16/24/32 bpp modes under 3D
- Both CRT and LCD monitors up to 100 Hz vertical refresh rate

Table 2. Video Modes

		SHG2 2D Mode Video Support			
2D Mode	**Refresh Rate (Hz)**	**8 bpp**	**16 bpp**	**24 bpp**	**32 bpp**
640x480	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
800x600	60, 70, 75, 90, 100	Supported	Supported	Supported	Supported
1024x768	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
1280x1024	43, 60	Supported	Supported	Supported	Supported
1280x1024	70, 72	Supported	–	Supported	Supported
1600x1200	60, 66	Supported	Supported	Supported	Supported
1600x1200	76, 85	Supported	Supported	Supported	–
3D Mode	**Refresh Rate (Hz)**	**SHG2 3D Mode Video Support with Z Buffer Enabled**			
640x480	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
800x600	60, 70, 75, 90, 100	Supported	Supported	Supported	Supported
1024x768	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
1280x1024	43, 60, 70, 72	Supported	Supported	–	–
1600x1200	60, 66, 76, 85	Supported	–	–	–
3D Mode	**Refresh Rate (Hz)**	**SHG2 3D Mode Video Support with Z Buffer Disabled**			
640x480	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
800x600	60, 70, 75, 90, 100	Supported	Supported	Supported	Supported
1024x768	60, 72, 75, 90, 100	Supported	Supported	Supported	Supported
1280x1024	43, 60, 70, 72	Supported	Supported	Supported	–
1600x1200	60, 66, 76, 85	Supported	Supported	–	–

SCSI Controller

The embedded Adaptec AIC-7899W dual function SCSI controller provides Ultra160 (LVDS), (Ultra 2), and Ultra wide (SE) SCSI interfaces as two independent PCI functions.

The Intel SHG2 baseboard provides active terminators, termination voltage, resetable fuse, and protection diode for both SCSI channels.

Modular RAID Capable PCI-X Slot 6

The SHG2 server board supports a modular RAID controller, such as the Intel® RAID Controller SRCMR, on PCI-X Slot 6. An add-in card installed in this slot leverages the onboard SCSI controller along with its own built-in intelligence to provide a complete RAID controller subsystem onboard. If a specified modular RAID card is installed, then SCSI interrupts are routed to the RAID card instead of the PCI-X interrupt controller effectively hiding the host-based I/O device from the system. The SHG2 Server Board uses an implementation commonly referred to as "RAIDIOS" to support this feature.

To use this feature, see "Enabling PCI-X on Slot 6 and Disabling On-board SCSI" on page 90.

For a complete list of qualified add-in cards, see:

http://support.intel.com/support/motherboards/server/SHG2

IDE Controller

The system includes a dual-channel enhanced IDE 32-bit interface controller for intelligent disk drives with disk controller electronics onboard. The controller has two connectors, Primary and Secondary, located on the system board, each of which supports a master and a slave device.

The device supports:

- PIO, ATA-100 Synchronous DMA, and bus master IDE transfer modes
- Ultra DMA 33/66/100 synchronous DMA transfers
- Master/slave IDE modes
- Up to four devices

USB Interface

The SHG2 Server Board provides three external USB connectors on the rear I/O panel. The external connectors are defined by the USB Specification, Revision 1.1. One additional USB connector is supported internally through a 10-pin header on the server board that can be cabled to a front panel board. All four ports function identically and with the same bandwidth.

Network Controllers

The server board includes two integrated onboard Network Interface Controllers (NICs).

One NIC is a 10BASE-T/100BASE-TX network solution based on the Intel 82550PM single-chip Fast Ethernet PCI Bus Controller. As a PCI bus master, the controller can burst data at up to 132 MB/s. The controller contains two receive and transmit FIFO buffers that prevent data overruns or underruns while waiting for access to the PCI bus. The controller has the following:

- 32-bit PCI bus master interface (direct drive of bus), compatible with *PCI Bus Specification*, Revision 2.2
- Chained memory structure with improved dynamic transmit chaining for enhanced performance
- Programmable transmit threshold for improved bus utilization
- Early receive interrupt for concurrent processing of receive data
- On-chip counters for network management
- Auto-detect and auto-switching for 10 or 100 Mbps network speeds
- Support for both 10 Mbps and 100 Mbps networks, capable of full or half duplex, with back-to-back transmit at 100 Mbps
- Low-power +3.3 V device
- Alert on LAN functionality

The second NIC is an Intel 82544GC Gigabit Ethernet Controller capable of providing 10/100/1000 Mbps data rates. It is a single-chip device containing both the MAC and PHY layer functions.

The 82544GC utilizes a 64-bit/100 MHz direct interface to the PCI-X bus. It is compliant with the PCI Local Bus Specification, Revision 2.2. It also supports the PCI-X extension to the PCI Local Bus, Revision 1.0a.

NOTE

If you install a 32/64-bit, 33/66 MHz PCI card in Add-in card slots 1 or 2, you will slow the PCI-X bus to the speed of the card you install. This will also slow the 82455GC's interface to the PCI-X bus.

Network Teaming Features

The network controller provides several options for increasing throughput and fault tolerance when running Windows† 2000 or NetWare† 6.0 or newer:

- Adapter Fault Tolerance (AFT) - provides automatic redundancy for your adapter. If the primary adapter fails, the secondary takes over. AFT works with any hub or switch.
- Adaptive Load Balancing (ALB) - creates a team of 2 - 4 adapters to increase transmission throughput. Also includes AFT. Works with any 10Base-TX or 100Base-TX switch.
- Fast EtherChannel† (FEC) - creates a team of 2, 3, or 4 adapters to increase transmission and reception throughput. Also includes AFT. Requires an FEC-enabled switch.

Adapter Fault Tolerance

Adapter Fault Tolerance (AFT) is a simple, effective, and fail-safe approach to increase the reliability of server connections. AFT gives you the ability to set up link recovery to the server adapter in case of a cable, port, or network interface card failure. By assigning two server adapters as a team, AFT enables you to maintain uninterrupted network performance.

AFT is implemented with two server adapters: a primary adapter and a backup, or secondary, adapter. During normal operation, the backup will have transmit disabled. If the link to the primary adapter fails, the link to the backup adapter automatically takes over.

Preferred Primary Adapter

With multiple adapters installed, you can specify one as the Preferred Primary adapter. For example if you have a server with an Intel® PRO/100 Intelligent Server adapter as the primary adapter and an Intel® PRO/1000 adapter as the secondary, you would want the PRO/100 Intelligent Server adapter to be the preferred primary. In this scenario, if the PRO/100 Intelligent Server adapter fails, the PRO/1000 will take over. Then when the PRO/100 Intelligent Server adapter is replaced, it will automatically revert to being the primary adapter in the team.

If a Preferred Primary is not selected, the Intel® PROSet II will attempt to select the best adapter based on adapter model and speed.

Mixed Adapter Teaming

AFT supports up to four PRO/1000 or PRO/100 adapters per team, in any mix.

Adaptive Load Balancing

Adaptive Load Balancing (ALB) is a simple and efficient way to increase your server's transmit throughput. With ALB you group server adapters in teams to provide an increased transmit rate (up to 400 Mbps) using a maximum of four adapters. The ALB software continuously analyzes transmit loading on each adapter and balances the rate across the adapters as needed. Adapter teams configured for ALB also provide the benefits of AFT. Receive rates remain at 100 Mbps.

To use ALB, you must have two, three, or four server adapters installed in your server or workstation and linked to the same network switch.

Keyboard and Mouse

The keyboard/mouse controller is PS/2-compatible. If specified through the System Setup Utility (SSU), the server may be locked automatically if there is no keyboard or mouse activity for a predefined length of time. Once the inactivity (lockout) timer has expired, the keyboard and mouse do not respond until the previously stored password is entered.

ACPI

The SHG2 supports the Advanced Configuration and Power Interface (ACPI) as defined by the ACPI 1.0b. An ACPI-aware operating system can put the system into a sleep state where the hard drives spin down, the system fans stop, and all processing is halted. However, the power supply will still be on and the processors will still be dissipating some power, so the power supply fan and processor fans will still run.

The SHG2 supports sleep states s0, s1, s4, and s5.

- s0: Normal running state.
- s1: Processor sleep state: No context will be lost in this state and the processor caches will maintain coherency.
- s4: Hibernate or Save to Disk: The memory and machine state are saved to disk. Pressing the power button or other wakeup event will restore the system state from the disk and resume normal operation. This assumes that no hardware changes have been made to the system while it was off.
- s5: Soft off: Only the real time clock (RTC) section of the chipset and the Baseboard Management Controller (BMC) are running in this state.

⚠ CAUTION

The system is off only when the AC power is disconnected.

Security

To help prevent unauthorized entry or use of the server, Intel® Server Management software monitors the system intrusion switch.

Security with Mechanical Locks and Monitoring

If installed, you can activate the chassis intrusion alarm switch. When the side door is opened, the switch transmits an alarm signal to the server board, where BMC firmware and server management software process the signal. The system can be programmed to respond to an intrusion by locking the keyboard, for example.

Software Locks

The BIOS Setup and the System Setup Utility (SSU) provide a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, you can access the system only after you enter the correct password(s). For example:

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period - 1 to 120 minutes.
- Set and enable a supervisor password.
- Set and enable a user password.
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches.
- Activate a hot-key combination to enter secure mode quickly.
- Disable writing to the diskette drive when secure mode is set.
- Disable access to the boot sector of the operating system hard disk drive.

Using Passwords

You can set either the user password, the supervisor password, or both passwords. If only the user password is set, you:

- Must enter the user password to enter BIOS Setup or the SSU.
- Must enter the user password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- Must enter the user password to exit secure mode.

If only the supervisor password is set, you:

- Must enter the supervisor password to enter BIOS Setup or the SSU.
- Must enter the supervisor password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- Must enter the supervisor password to exit secure mode.

If both passwords are set, you:

- May enter the user password to enter BIOS Setup or the SSU. However, you will not be able to change many of the options.
- Must enter the supervisor password if you want to enter BIOS Setup or the SSU and have access to all of the options.
- May enter either password to boot the server if Password on Boot is enabled in either the BIOS Setup or SSU.
- May enter either password to exit secure mode.

Secure Mode

Configure and enable the secure boot mode by using the SSU. When secure mode is in effect:

- You can boot the server and the operating system will run, but you must enter the user password to use the keyboard or mouse.
- You cannot turn off system power or reset the server from the front panel switches.

Secure mode has no effect on functions enabled via the Server Manager Module or power control via the real time clock.

Taking the server out of secure mode does not change the state of system power. That is, if you press and release the power switch while secure mode is in effect, the system will not be powered off when secure mode is later removed. However, if the front panel power switch remains depressed when secure mode is removed, the server will be powered off.

Summary of Software Security Features

The table below lists the software security features and describes what protection each offers. In general, to enable or set the features listed here, you must run the SSU and go to the Security Subsystem Group, menu. The table also refers to other SSU menus and to the BIOS Setup utility.

Table 3. Software Security Features

Feature	Description
Secure mode	**How to enter secure mode:** • Setting and enabling passwords automatically places the system in secure mode. • If you set a hot-key combination (through Setup), you can secure the system simply by pressing the key combination. This means you do not have to wait for the inactivity time-out period. When the system is in secure mode: The server can boot and run the operating system, but mouse and keyboard input is not accepted until the user password is entered. At boot time, if a CD is detected in the CD-ROM drive or a diskette in drive A, the system prompts for a password. When the password is entered, the server boots from CD or diskette and disables the secure mode. If there is no CD in the CD-ROM drive or diskette in drive A, the server boots from drive C and automatically goes into secure mode. All enabled secure mode features go into effect at boot time. To leave secure mode: Enter the correct password(s).
Disable writing to diskette	In secure mode, the server will not boot from or write to a diskette unless a password is entered. To write protect access to diskette whether the server is in secure mode or not, use the Setup main menu, Floppy Options, and specify Floppy Access as read only.

continued

Table 3. Software Security Features (continued)

Feature	Description
Set a time-out period so that keyboard and mouse input are not accepted Also, screen can be blanked, and writes to diskette can be inhibited	Specify and enable an inactivity time-out period of from 1 to 120 minutes. If no keyboard or mouse action occurs for the specified period, attempted keyboard and mouse input will not be accepted. The monitor display will go blank, and the diskette drive will be write protected (if these security features are enabled through Setup). To resume activity: Enter the correct password(s).
Control access to using the SSU: set supervisor password	To control access to setting or changing the system configuration, set a supervisor password and enable it through Setup. If both the supervisor and user passwords are enabled, either can be used to boot the server or enable the keyboard and/or mouse, but only the supervisor password will allow Setup to be changed. To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the Supervisor Password Option menu found in the Security Subsystem Group. To clear the password if you cannot access Setup, change the Clear Password jumper (see Chapter 7).
Control access to the system other than SSU: set user password	To control access to using the system, set a user password and enable it through Setup. To disable a password, change it to a blank entry or press CTRL-D in the Change Password menu of the User Password Option menu found in the Security Subsystem Group. To clear the password if you cannot access Setup, change the Clear Password jumper (see Chapter 7).
Boot without keyboard	The system can boot with or without a keyboard. During POST, before the system completes the boot sequence, the BIOS automatically detects and tests the keyboard if it is present and displays a message.
Specify the boot sequence	The sequence that you specify in Setup will determine the boot order. If secure mode is enabled (a user password is set), then you will be prompted for a password before the server fully boots. If secure mode is enabled and the “Secure Boot Mode” option is also enabled, the server will fully boot but will require a password before accepting any keyboard or mouse input.

2 Server Board Installation

Tools and Supplies Needed

- Phillips† (cross head) screwdriver (#1 bit and #2 bit)
- Flat blade screwdriver
- Antistatic wrist strap and conductive foam pad (recommended)

Before You Begin

Emissions Disclaimer

To ensure EMC compliance with your local regional rules and regulations, the final configuration of your end system product may require additional EMC compliance testing. For more information, please contact your local Intel Representative.

See "Regulatory and Integration Information" on page 91 for product Safety and EMC regulatory compliance information. This is an FCC Class A device. Integration of it into a Class B chassis does not result in a Class B device.

Safety Cautions

⚠ CAUTIONS

Electrostatic discharge (ESD) & ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Safety and Regulatory Compliance

See “Regulatory and Integration Information” on page 91 for product Safety and EMC regulatory compliance information.

Intended uses: This product was evaluated for use in servers that will be installed in offices, computer rooms, and similar locations. Other uses require further evaluation.

EMC testing: Before computer integration, make sure that the chassis, power supply, and other modules have passed EMC testing using a server board with a microprocessor from the same family (or higher) and operating at the same (or higher) speed as the microprocessor used on this server board.

Server board diagram label provided: Place the label inside the chassis in an easy-to-see location, preferably oriented similarly to the server board.

Minimum Hardware Requirements

To avoid integration difficulties and possible board damage, your system must meet the following minimum requirements.

For more information on supported processors and qualified memory and chassis components, see:

http://support.intel.com/support/motherboards/server/SHG2

Processor

A minimum of one 1.8 GHz Intel Xeon processor with 512K cache support packaged in a 603-pin micro-PGA (Pin-Grid Array).

Memory

Minimum of two 128 MB ECC, DDR 200 or 266-compliant registered SDRAM 184-pin gold DIMMs. DIMMs must be populated in identical pairs.

Power Supply

Minimum of 450 W with 1.2 A +5 V standby current (in order to support Wake On LAN† (WOL)) and 12+ V CPU power support [ATX], which meets the SSI EPS 12 V specification. You must provide standby current, or the board will not boot.

For more information on the SSI EPS 12 V specification, see:

http://www.ssiforum.org

Installation Notes

Installation Process Quick Reference

Step	Where the information is located
Install the primary processor	This guide
Install the secondary processor (optional)	This guide
Install memory	This guide
Remove the access cover	Your chassis manual
Install the I/O shield	This guide
Rearrange the standoffs	This guide
Install the server board	This guide
Connect cables to the server board	This guide and your chassis manual
Finish setting up your chassis	Your chassis manual

Installation Procedures

Installing the I/O Gasket and Shield

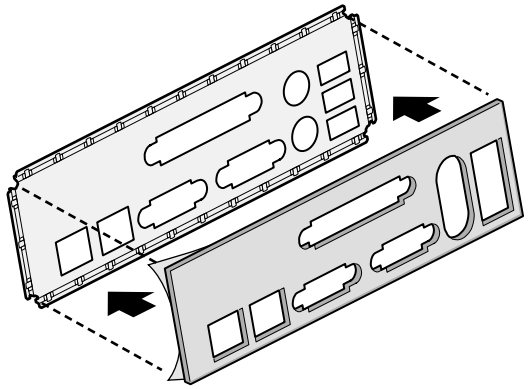
NOTE

An ATX 2.03-compliant I/O shield is provided with the server board. The shield is required by Electromagnetic Interference (EMI) regulations to minimize EMI. If the shield does not fit the chassis, obtain a properly sized shield from the chassis supplier.

The shield fits the rectangular opening in the back of a chassis. The shield has cutouts that match the I/O ports. Install the shield from inside the chassis.

Attaching the Gasket to the I/O Shield

1. Remove the two backing strips from the gasket.
2. Press the gasket onto the inside face of the I/O shield as shown.

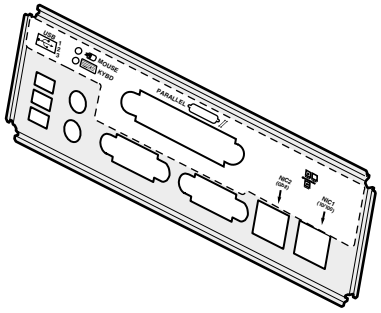


OM14359

Figure 3. Attaching the Gasket to the I/O Shield

Attaching the Label to the I/O Shield

1. Remove the backing from the label included with your server board.
2. Press the label onto the outside face of the I/O shield.

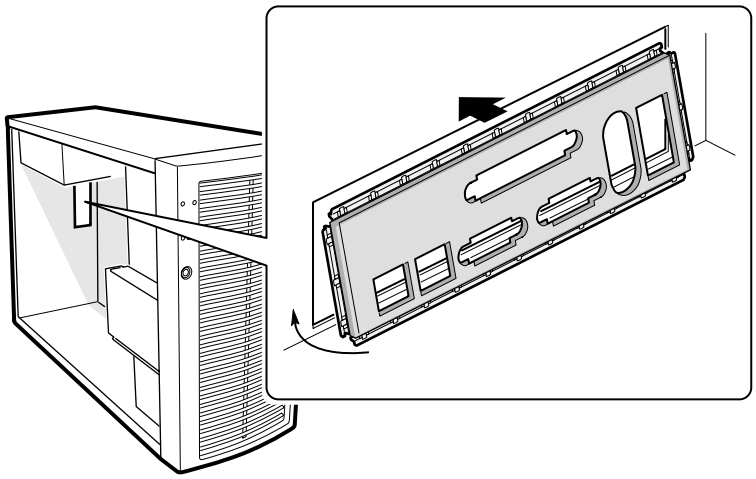


OM14360

Figure 4. Attaching the Label to the I/O Shield

Installing the I/O Shield

1. Position one edge so that the dotted groove is outside the chassis wall, and the lip of the shield rests on the inner chassis wall.
2. Hold the shield in place, and push it into the opening until it is seated. Make sure the I/O shield snaps into place all the way around.



OM14361

Figure 5. Installing the I/O Shield

Installing Memory

The SHG2 Server Board contains six 184-pin DIMM sockets. Memory is partitioned as three banks. DIMMs must be populated in identical pairs.

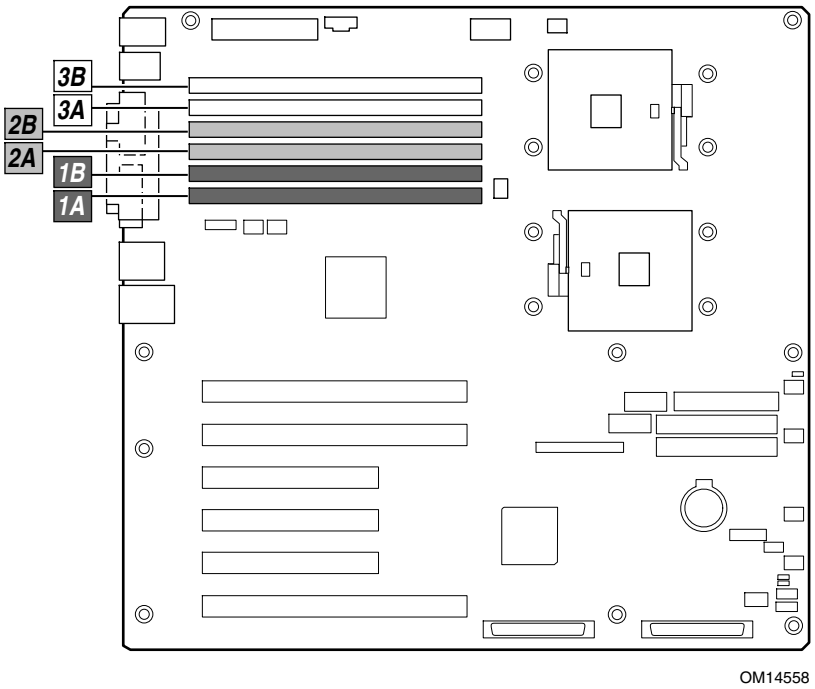


Figure 6. DIMM Locations

The SHG2 server board supports up to six 2.5 V, ECC, DDR 200 or 266-compliant, registered SDRAM 184-pin gold DIMMs. A wide range of DIMM sizes are supported, including 128 MB, 256 MB, 512 MB, 1 GB, and 2 GB DIMMs. The minimum supported memory configuration is 256 MB, using two identical 128 MB DIMMs. The maximum configurable memory size is 12 GB using six 2 GB DIMMs.

The SDRAM interface runs at 200 MHz; however 266 MHz memory can be used. The memory controller supports 2-way interleaved SDRAM, memory scrubbing, single-bit error correction and multiple-bit error detection with Chipkill capability that allows the system to continue to run even in the event of a multi-bit SDRAM failure. Memory can be implemented with either single-sided (one row) or double-sided (two row) DIMMs.

NOTE

Use DIMMs that have been tested for compatibility with the server board. Contact your sales representative or dealer for a current list of approved memory modules. Check the Intel Customer Support website for the latest tested memory list:

http://support.intel.com/support/motherboards/server/SHG2

1. If the server board is not already installed in the chassis, remove the server board from its packaging and place it on a clean ESD protected work surface such as the antistatic plastic packaging in which the board was shipped.
2. Open both DIMM socket levers.
3. Insert DIMM making sure the connector edge of the DIMM aligns correctly with the slot.
4. Check that socket levers are securely latched. DIMMs must be populated in identical pairs.

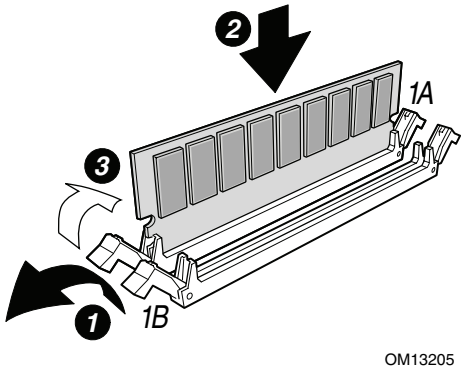


Figure 7. Installing Memory

Configuring Chassis Standoffs

If your chassis does not have standoffs placed as shown below, you must rearrange them so they match the holes in the server board. Failure to properly rearrange the metal standoffs may cause the server board to malfunction and may permanently damage it. Your chassis may be different from the illustration.

For the Intel SC5200 chassis:

1. Install standoffs in positions 5, 18, S, 19 and in the eight positions marked P. Standoffs are included with your chassis. Standoff numbering in other chassis may be different.

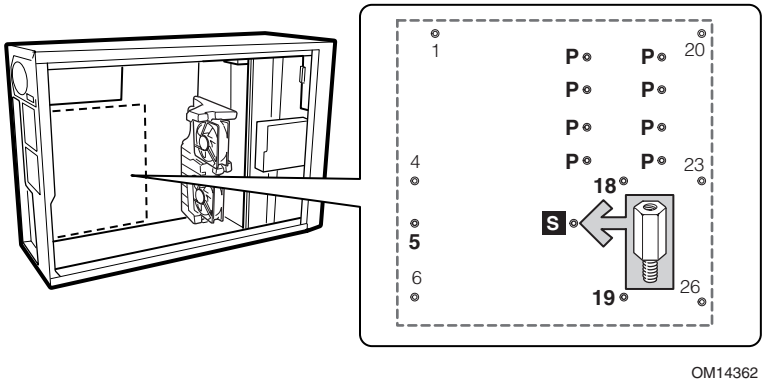


Figure 8. Configuring Chassis Standoffs

Installing the Server Board

1. Place the board into the chassis, making sure that the back panel I/O shield openings and chassis standoffs align correctly.
2. Attach the board with the screws included with your chassis at the ten locations marked below. For the Intel SC5200 chassis, these screws are packaged in a bag labeled “C.”

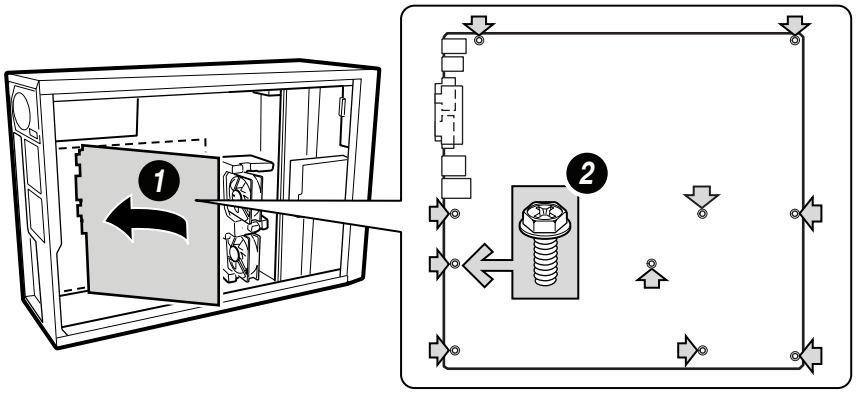


Figure 9. Placing the Server Board in the Chassis

Installing the Processor(s)

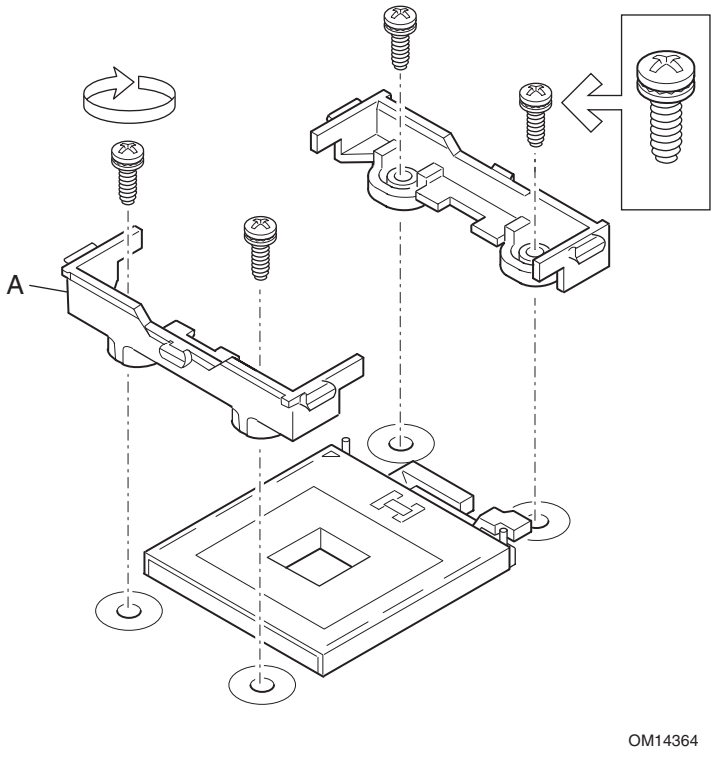
⚠ CAUTIONS

If only one processor is to be used, it must be installed in the Processor Socket labeled CPU1, which is the socket closest to the corner of the server board.

If you are adding a second processor to your system, you must verify that the second processor is identical in speed to the first processor.

This server board has “zero-insertion-force” sockets. If processor does not drop easily into socket holes, make sure the lever is in the full-upright position and the processor is oriented properly.

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional precautions given here.
2. Install the retention brackets for the primary processor by inserting the retention brackets and tightening the four retention screws. The primary processor socket is located nearest to the corner of the server board. If installing a second processor, install the retention brackets for the secondary processor.



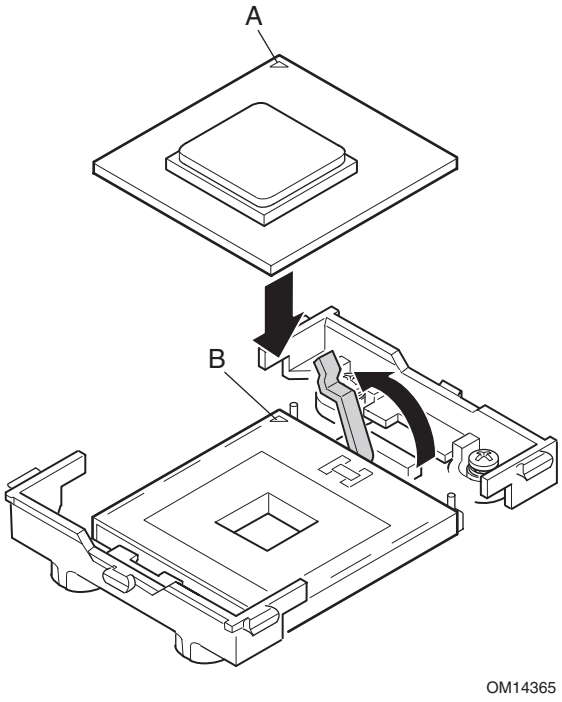
A. Heat Sink Retention Bracket

Figure 10. Installing the Retention Brackets

3. Lift the socket lever on the processor socket labeled CPU1. (If adding a second processor, lift the socket lever on the processor socket labeled CPU2.)
4. Align the pins of the processor with the socket, and insert the processor into the socket. Lower the socket lever completely.

NOTE

When installing a second processor, note that the secondary processor socket is oriented so that the processor pins are rotated 180° relative to the primary processor socket.



A. Alignment Triangle Mark
B. Alignment Triangle Cutout

Figure 11. Opening Socket Lever and Attaching Processor

5. Apply thermal grease to the processor as shown.

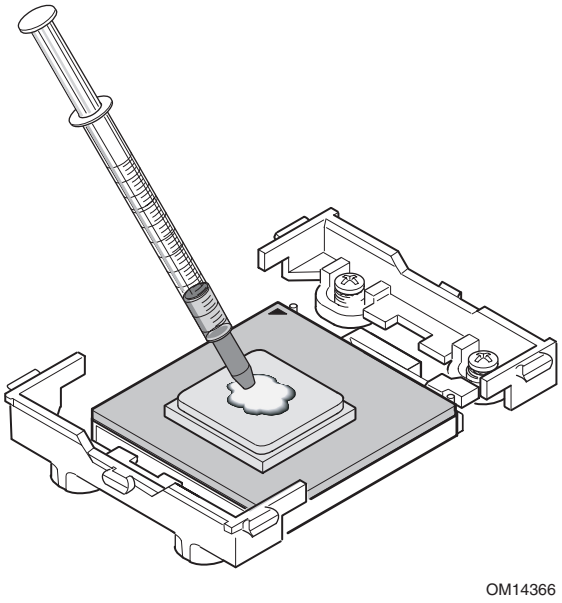


Figure 12. Applying Thermal Grease

6. Align the heat sink with the retention brackets and place heat sink on the processor.

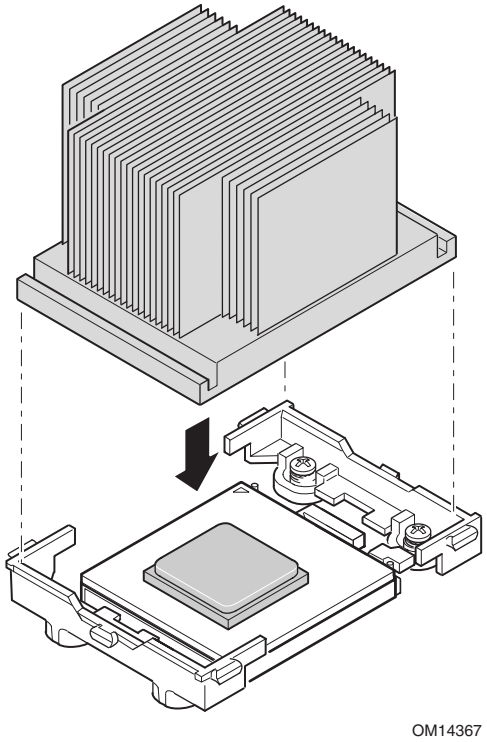


Figure 13. Aligning the Heat Sink

7. Position the retention clip over the plastic tab and engage the retention clip end-slot over the plastic tab (see 1 in Figure 14). Note that the slot in the clip provides room for side-to-side motion while engaging the retention clip slots located at each end.
8. Press downward on the retention clip ends over the plastic tabs on the retention bracket (see 2 in Figure 14).
9. Install two retention clips for each processor you install.

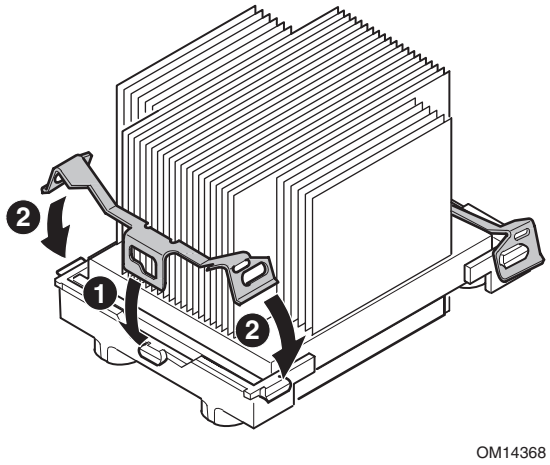


Figure 14. Attaching the Heat Sink and Retention Clip

Installing the Processor Wind Tunnel

The following instructions apply to the Intel SC5200 Base Server Chassis and reference chassis installations. If you are installing your server board in the Intel SC5200 Hot-Swap, Redundant Power Server Chassis, DO NOT install the processor wind tunnel. The ducting in the Intel SC5200 Hot-Swap, Redundant Power Server Chassis eliminates the need for a processor wind tunnel.

Air flow for the processor wind tunnel should be directed toward the rear of the chassis as shown below.

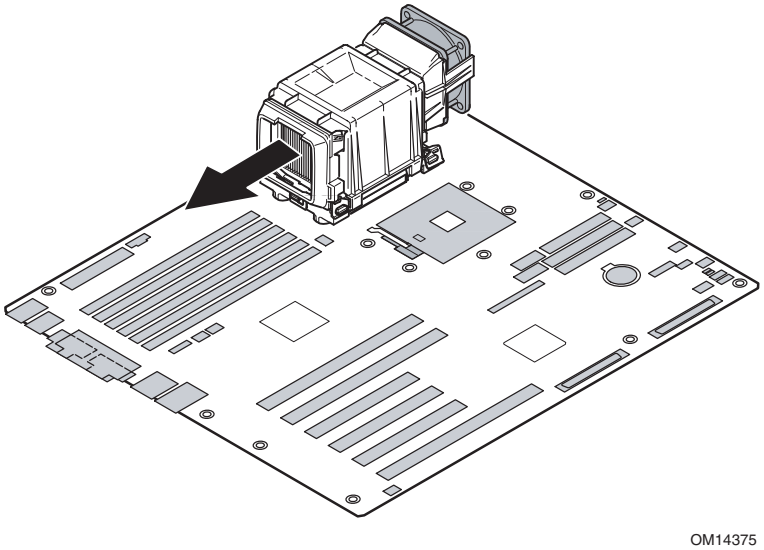


Figure 15. Processor Wind Tunnel Air Flow

1. Install processor wind tunnel center section over the heat sink / processor assembly. Note that plastic tabs on the wind tunnel center section engage the tabs on the retention clips.

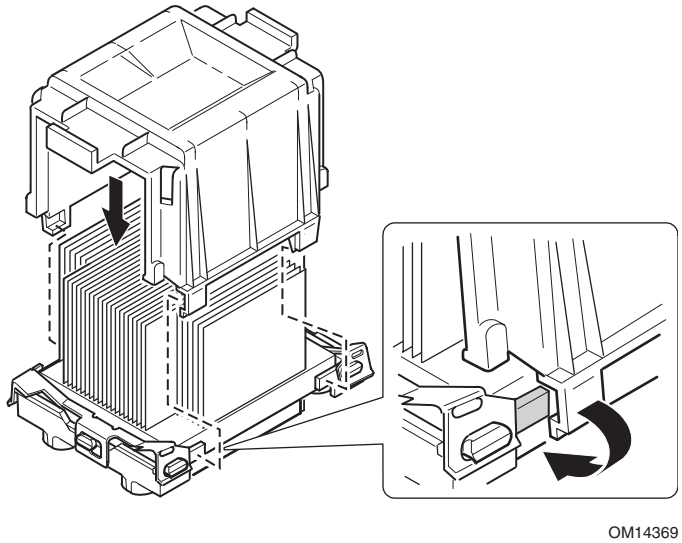


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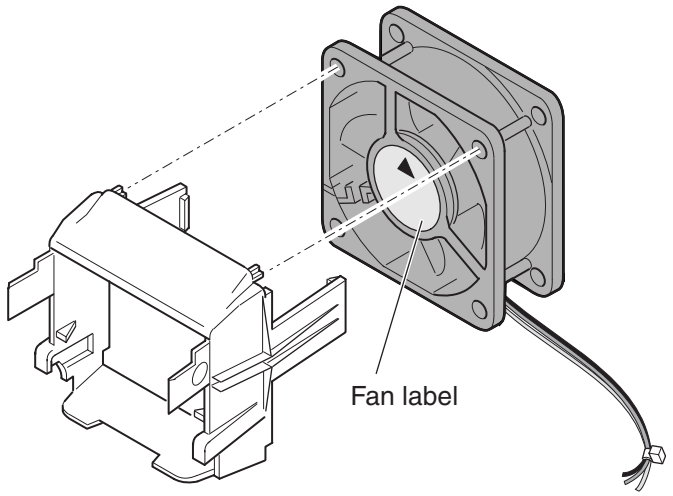
Figure 16. Attaching the Wind Tunnel Assembly

2. Attach the processor wind tunnel fan to the wind tunnel air intake assembly as shown. The fan label must be pointing into the air intake assembly.



OM14370

Figure 17. Attaching the Heat Sink Fan to the Air Intake Assembly

⚠ CAUTION

To ensure proper system cooling, the heat sink fan must be installed as shown in Figure 18 and the air intake fan assembly must be attached to the side of the processor / wind tunnel assembly nearest to the front of the chassis.

3. Attach the air intake fan assembly to the side of the heat sink wind tunnel closest to the front of the chassis.
   a. Press both sides of the air intake section to bend tabs inward (see 1 in Figure 18).
   b. Insert tabs into slots on the wind tunnel center section (see 2 in Figure 18).
   c. Press the air intake section downward to engage the assembly (see 3 in Figure 18).

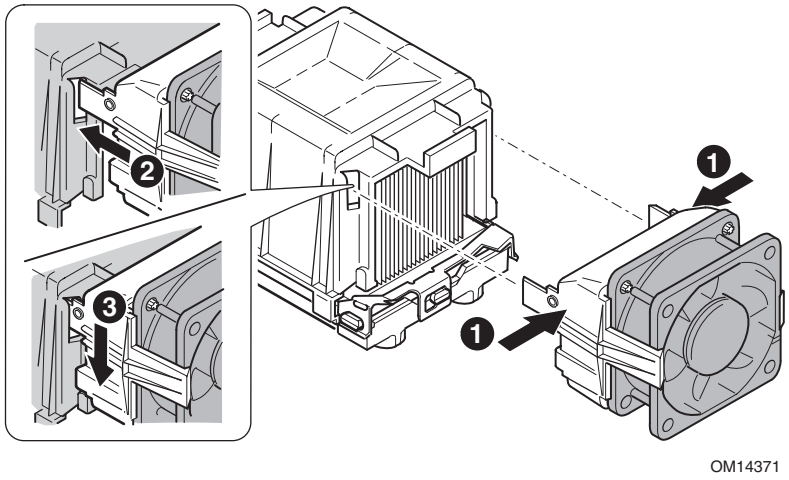


Figure 18. Attaching the Wind Tunnel Intake and Exhaust

4. Attach the air exhaust fan assembly to the heat sink wind tunnel.
   a. Press both sides of the air exhaust section to bend tabs inward (see 1 in Figure 19).
   b. Insert tabs into slots on the wind tunnel center section (see 2 in Figure 19).
   c. Press the air intake section downward to engage the assembly (see 3 in Figure 19).

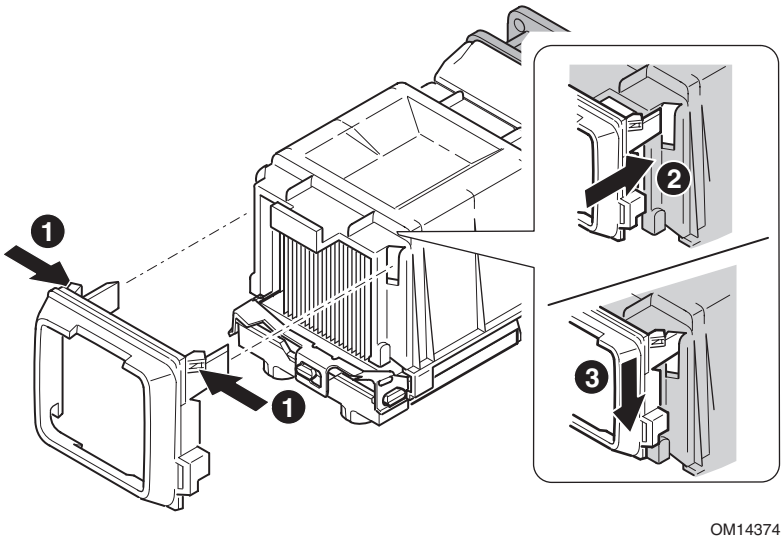
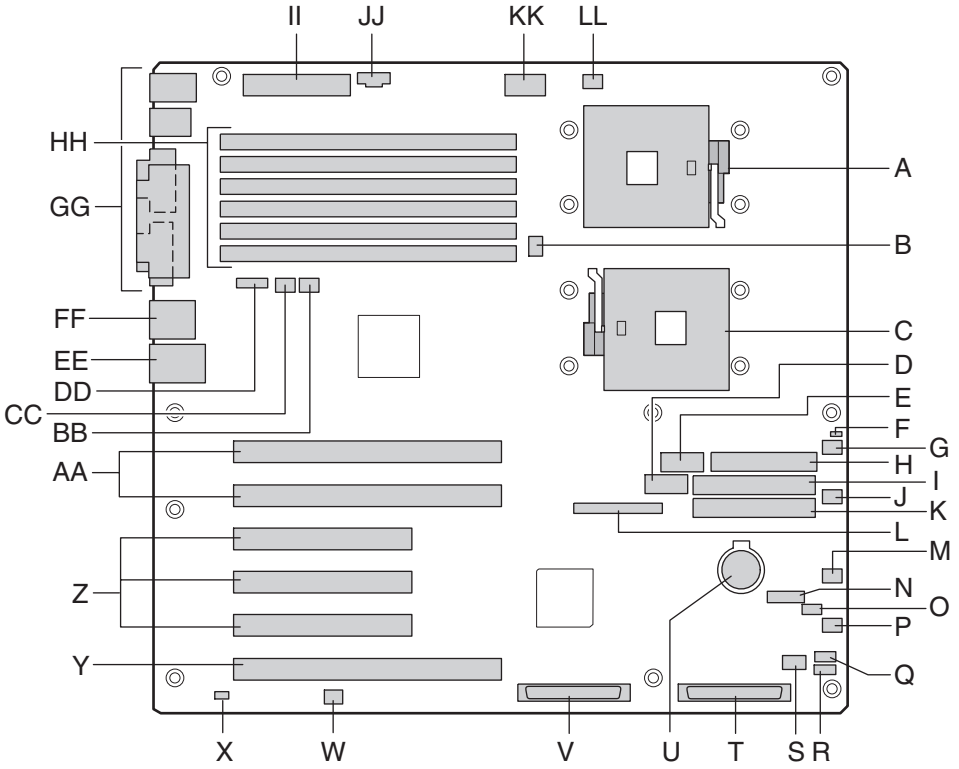


Figure 19. Attaching the Wind Tunnel Intake and Exhaust

5. Attach CPU Fan cable(s). See the next section “Making Connections to the Server Board” for fan connector location information.

Making Connections to the Server Board



A. Primary Processor Socket (CPU1)
B. CPU2 Fan
C. Secondary Processor Socket (CPU2)
D. Front Panel USB
E. Serial B
F. Jumper Block CN27
G. System Fan 5
H. Floppy disk drive connector
I. Secondary IDE
J. System Fan 6
K. Primary IDE
L. Front Panel connector
M. IPMB
N. Jumper Block CN43
O. System Fan 3
P. System Fan 4
Q. HSBP B
R. HSBP A
S. HDD LED
T. LVD SCSI B
U. Battery
V. LVD SCSI A
W. Jumper block CN53
X. Chassis Intrusion
Y. PCI-X 64-bit/133 MHz
Z. PCI 32-bit/33 MHz
AA. PCI-X 64-bit/100 MHz
BB. System Fan 1
CC. System Fan 2
DD. ICMB
EE. NIC1 (10/100)
FF. NIC2 (Gbit)
GG. System I/O connectors
HH. DIMMs
II. Main Power
JJ. Aux Sig
KK. +12 V CPU Power
LL. CPU1 Fan

Figure 20. Making Connections to the Server Board

Intel® SC5200 Base Server Chassis Note

Connect front system fans to the System Fan 3 and System Fan 5 connectors on the server board.

Intel SC5200 Hot-Swap, Redundant Power Server Chassis Note

Be sure to attach system fans to their correspondingly numbered connector on the server board. System fan numbers can be found on the system fan carrier and on the system fan cables.

Cable Routing – Intel SC5200 Base Chassis

To ensure proper air-flow within the chassis, follow the cable routing guidelines below.

IDE or SCSI Cables

Cables that connect to devices in the lower device bays should be routed around the epac system fan carrier as shown below.

1. Route cables as shown.
2. Replace the top half of the epac.

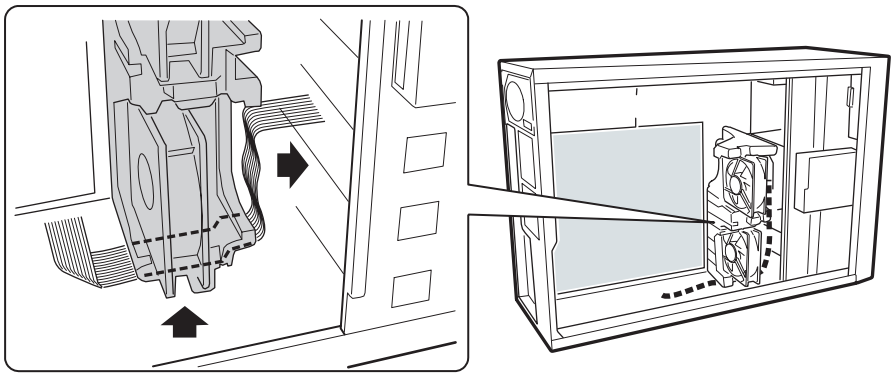
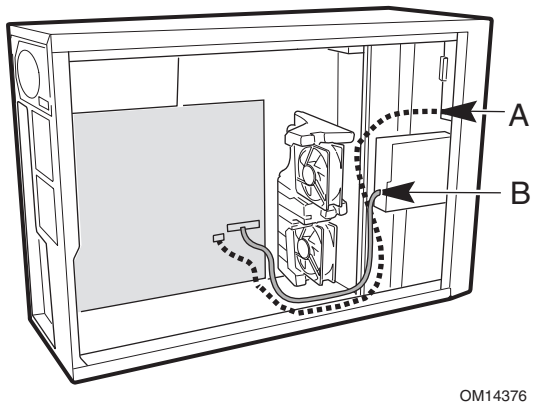


Figure 21. Routing Cables

Floppy and Front Panel Cables

Route the floppy drive and front panel cables as shown.

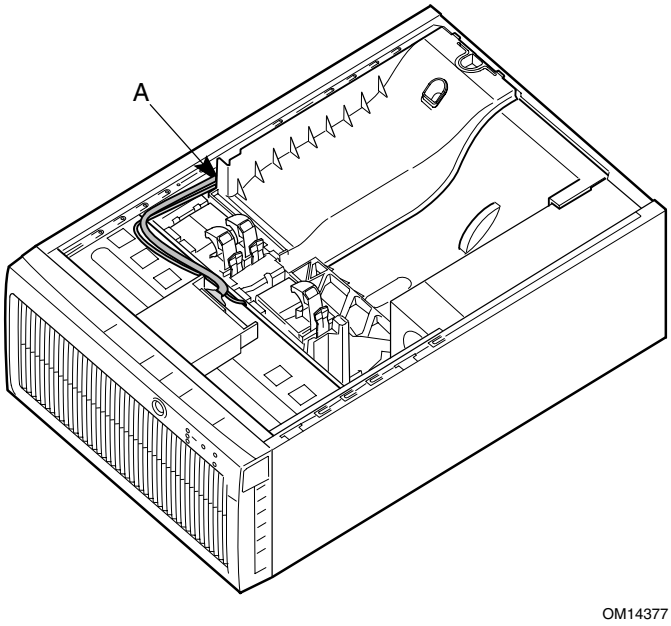


A. Front Panel Cable
B. Floppy Diskette Cable

Figure 22. Routing the Floppy and Front Panel Cables

Cable Routing – Intel SC5200 Hot-Swap, Redundant Power Chassis

Route the floppy drive cable and the hot-swap drive bay ICMB cable between the chassis wall and the hot-swap fan holder as shown below at location A.



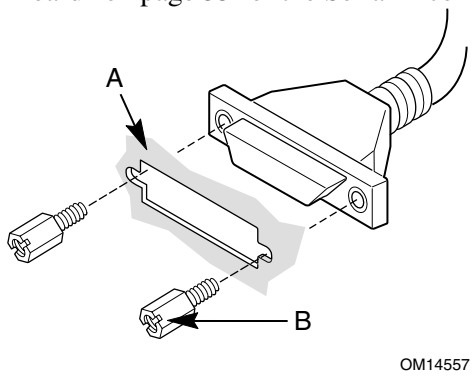
A. Cable Routing Location

Figure 23. Routing the Floppy and ICMB Cables

Installing the Serial B Cable

For the Intel SC5200 chassis, you can connect the Serial B serial port cable to either the front (rack configuration only) or back panels. Connecting it to the back panel is illustrated below.

1. Install the Serial B cable by inserting it into the chassis back panel cutout and attaching it as shown.
2. Attach the other end to the Serial B connector located on your server baseboard. See "Making Connections to the Server Board" on page 35 for the Serial B connector location.



A. Chassis Back Panel Cutout
B. Screw

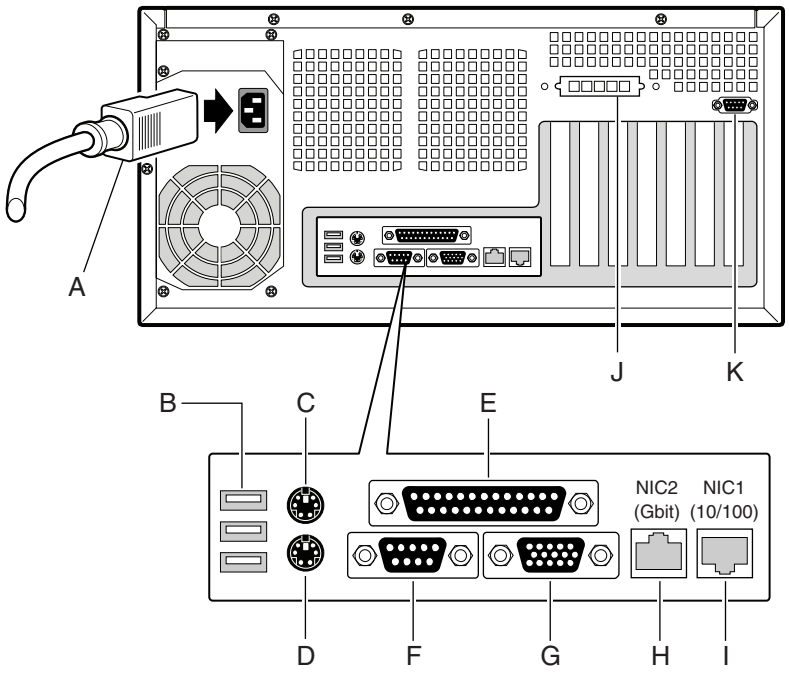
Figure 24. Installing the Serial B Cable

Finishing Up

WARNING

An electrical shock hazard exists if the chassis cover is not replaced before connecting the chassis AC power.

1. Install the chassis cover according to the instructions for your chassis.
2. See your chassis documentation to complete rack or pedestal installation.
3. Connect the keyboard, mouse and monitor cables to the back panel.
4. Connect the power cable to the back panel and to an AC outlet.



A	AC Power*	G	Video
B	USB 1,2, 3	H	NIC2 (Gbit)
C	Mouse	I	NIC1 (10/100)
D	Keyboard	J	ICMB/External SCSI Connector Knockout*
E	Parallel Port	K	Serial B Knockout*
F	Serial A		

* Intel SC5200 Base chassis shown here. Item may be different on your chassis.

Figure 25. Making Back Panel Connections

Getting Started with Intel® Server Management and Intel® SMaRT Tool (Optional)

Intel® Server Management and the hard drive Service Partition provide real-time monitoring and alerting for your SHG2 server hardware, emergency remote management, and remote server setup. Intel Server Management is implemented by installing it within client-server architecture.

The Service Partition provides you with the ability to remotely access a local partition on the server and to identify and diagnose server health issues. Remote access is provided through either a modem or network connection.

To get started with Intel Server Management, install the Service Partition first, then the system's operating system, and finally Intel Server Control. The information here describes installation on a system running a Microsoft Windows operating system.

The Intel® Server Maintenance and Reference Training (SMaRT) Tool is an interactive software tool providing support information to assist with the maintenance and repair of Intel-based server systems and accessories. SMaRT Tool features visual, step-by-step instructions for replacing parts; a complete Field Replacement Unit (FRU) database containing part numbers and images; product spares lists, and worldwide Intel support information.

Intel Server Management provides an interface to the Intel® SMaRT Tool, combining remote error detection and alerting with interactive maintenance and repair assistance. When Intel Server Management detects a hardware error and a part needs replacing, SMaRT Tool can be launched directly from Intel Server Management to locate the correct part information and corresponding "How to Replace" steps required to quickly get the server back up and running.

To activate Intel Server Management's interface with the Intel SMaRT Tool, both software programs need to be installed. You can install the software on a server or on a workstation used to manage the server. The information here describes installation on a system running a Microsoft Windows operating system. For other operating systems, see the *Installation Guide & User Guide* located in the "ISM/Docs" folder on the Intel Server Management CD-ROM. SMaRT Tool and ISM Console may only be installed on a system running a Microsoft Windows operating system.

Note: Prior to installation, uninstall any previous version of Intel Server Control.

Installing a Service Partition on the Server (Optional)

The Service Partition provides advanced remote management and configuration functionality. Installing it on a server is optional.

1. Power-on the server, insert the *Intel Server Management CD* into the CD-ROM drive, and boot to the CD.
2. Select **Utilities > Run Service Partition Administrator > Create Service Partition-first time**.
3. Select an available hard drive. The server will reboot to the CD.
4. Select **Format Service Partition and Install Software**.
5. Exit the menu. Remove the CD and reboot to install the server operating system. After installing the operating system, proceed to Installing Intel Server Management.

Installing your Operating System

Install your operating system now.

Installing Intel Server Management

You can install Intel Server Management on a local server or on a remote workstation that is used to manage a LAN/WAN.

1. Insert the *Intel Server Management CD* into the system's CD-ROM.
2. Click **Install Server Management**.
3. Complete the Registration form and click **Submit**.
4. Select the applicable system option.
5. Review the Intel Software License Agreement and click **Accept**.
6. If installing to a local server, click **Install Now**. If this is a multiple system installation, click **Add** to compile a list of systems and then click **Install Now**.
7. Select **Reboot Now** or **Reboot Later**.
8. Remove the Intel Server Management CD.

Installing Intel SMaRT Tool

Follow the instructions below to install the Intel Server Maintenance and Reference Training Tool (SMaRT Tool) on your system.

✏ NOTES

SMaRT Tool may only be installed on a system running a Microsoft Windows operating system.

To download the SHG2 SC5200 server system module for SMaRT Tool, you must have Internet access.

1. Insert the Intel Server Board SHG2 Resource CD into the system's CD-ROM drive.
2. Click on **Intel SMaRT Tool** in the menu on the left side of the screen.
3. In the green **Make a Selection** drop-down menu, select **SMaRT Tool Install Guide**. Print the Guide, and keep it on hand for reference.
4. Review the SMaRT Tool Install Guide prior to proceeding.
5. In the **Make a Selection** drop-down menu, select **Install SMaRT Tool**.
6. Click on the **Run Installer** icon to launch the SMaRT Tool Setup program.
7. Follow the on-screen installation instructions. Review the Intel Software License Agreement and click **Accept**. When installation is complete, launch SMaRT Tool.
8. In SMaRT Tool's Welcome page, click on **Systems**.
9. Select **Select System > Servers > Xeon > SHG2 SC5200** and then follow the on-screen instructions to download the SHG2 SC5200 server system module. When download is complete, SMaRT Tool will restart.
10. Select **Systems > Select System > Servers > Xeon > SHG2 SC5200** to access information on your new server system.
11. You can invoke SMaRT Tool directly from Intel Server Management's Platform Instrumentation Control application by clicking on the SMaRT Tool icon, or by selecting **Launch SMaRT Tool** from the **SMaRT Tool** menu. The interface between the two programs is context-sensitive. To find out more about the integration between Intel SMaRT Tool and Intel Server Management, please select **SMaRT Tool and Server Management** in the **Make a Selection** drop-down menu.

3 Upgrading

Tools and Supplies Needed

- Phillips (cross head) screwdriver (#1 bit and #2 bit)
- Antistatic wrist strap and conductive foam pad (recommended)

Cautions

These warnings and cautions apply throughout this chapter. Only a technically qualified person should configure the server board.

⚠ CAUTIONS

System power on/off: The power button DOES NOT turn off the system AC power. To remove power from system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis, add, or remove any components.

Hazardous conditions, devices & cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) & ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine needle nosed pliers. If your jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the stake pins on the board.

Memory

The SHG2 Server Board contains six 184-pin DIMM sockets. Memory is partitioned as three banks. DIMMs must be populated in identical pairs.

The SHG2 server board supports up to six 2.5 V, ECC, DDR 200 or 266-compliant, registered SDRAM 184-pin gold DIMMs. A wide range of DIMM sizes are supported, including 128 MB, 256 MB, 512 MB, 1 GB, and 2 GB DIMMs. The minimum supported memory configuration is 256 MB, using two identical 128 MB DIMMs. The maximum configurable memory size is 12 GB using six 2 GB DIMMs.

The SDRAM interface runs at 200 MHz; however 266 MHz memory can be used. The memory controller supports 2-way interleaved SDRAM, memory scrubbing, single-bit error correction and multiple-bit error detection with Chipkill capability that allows the system to continue to run even in the event of a multi-bit SDRAM failure. Memory can be implemented with either single-sided (one row) or double-sided (two row) DIMMs.

✏ NOTE

Use DIMMs that have been tested for compatibility with the server board. Contact your sales representative or dealer for a current list of approved memory modules. Check the Intel Customer Support website for the latest tested memory list:

http://support.intel.com/support/motherboards/server/SHG2

1. Open both DIMM socket levers.
2. Insert DIMM making sure the connector edge of the DIMM aligns correctly with the slot.
3. Check that socket levers are securely latched. DIMMs must be populated in identical pairs.

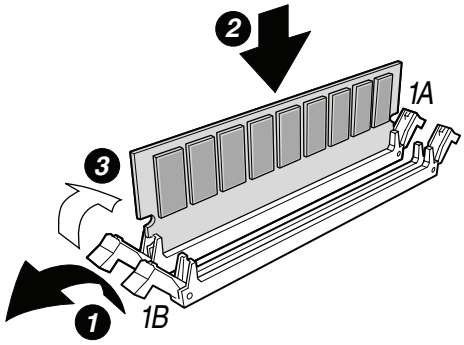


Figure 26. Installing Memory

Processors

⚠ WARNING

If the server has been running, any installed processor and heat sink on the processor board(s) will be hot. To avoid the possibility of a burn, be careful when removing or installing server board components that are located near processors.

⚠ CAUTIONS

Adding a second processor: If you are adding a second processor to your system, you must verify that the second processor is identical to the first processor.

Processor upgrades must be appropriate: You may damage the server if you install a processor that is inappropriate for your server. Make sure your server can handle a newer, faster processor (thermal and power considerations). For exact information about processor interchangeability, contact your customer service representative or visit the Intel Customer Support website:

http://support.intel.com/support/motherboards/server/SHG2

ESD and handling processors: Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following: (1) Touch the metal chassis before touching the processor or server board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor. (2) Avoid moving around unnecessarily.

Adding or Replacing a Processor

If you are adding a second processor to your system, the second processor must be identical in speed with the first processor.

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional cautions given here.
2. Remove power from your system by unplugging the AC power cord.
3. Remove the side cover (see your system or chassis documentation for instructions).
4. Install the retention brackets for the primary processor by inserting the retention brackets (A) and tightening the four retention screws. The primary processor socket is located nearest to the corner of the server board. If installing a second processor, install the retention brackets for the secondary processor.

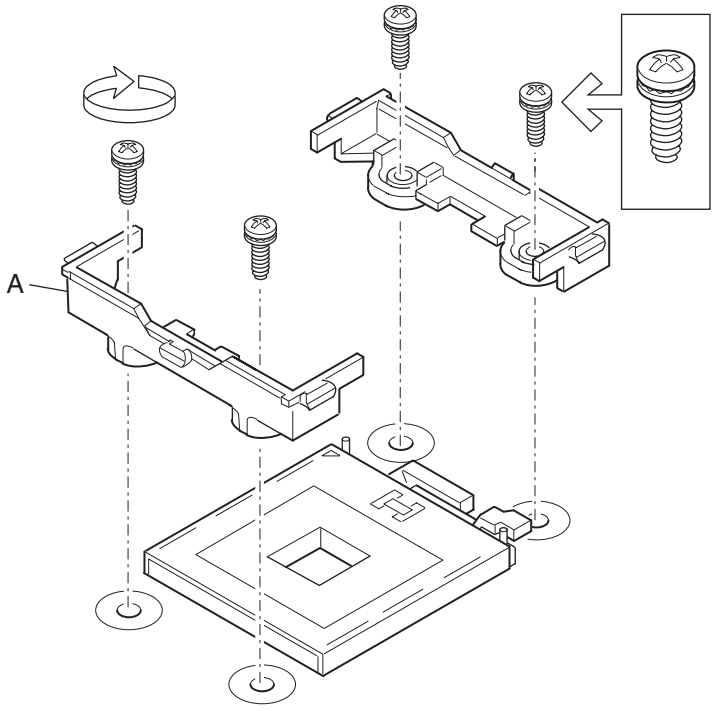
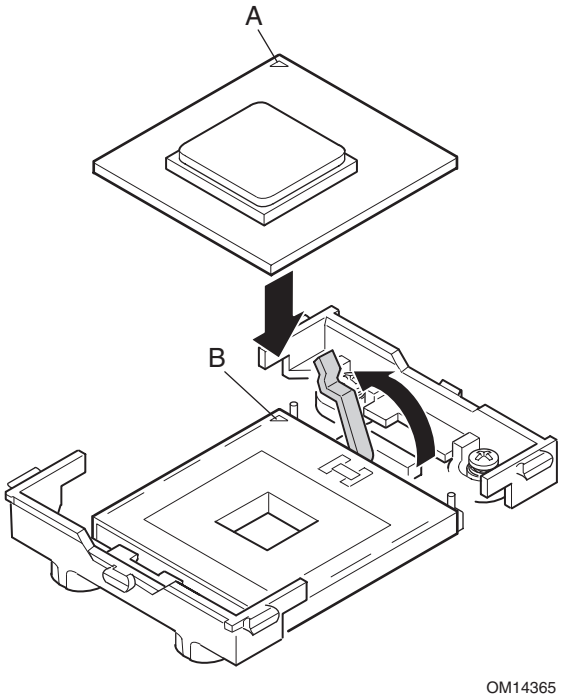


Figure 27. Installing the Retention Brackets

5. Lift the socket lever on the processor socket labeled CPU1. (If adding a second processor, lift the socket lever on the processor socket labeled CPU2.)
6. Align the pins of the processor with the socket, and insert the processor into the socket. Lower the socket lever completely.

NOTE

When installing a second processor, note that the secondary processor socket is oriented so that the processor pins are rotated 180° relative to the primary processor socket.



C. Alignment Triangle Mark
D. Alignment Triangle Cutout

Figure 28. Opening Socket Lever and Attaching Processor

7. Apply thermal grease to the processor as shown.

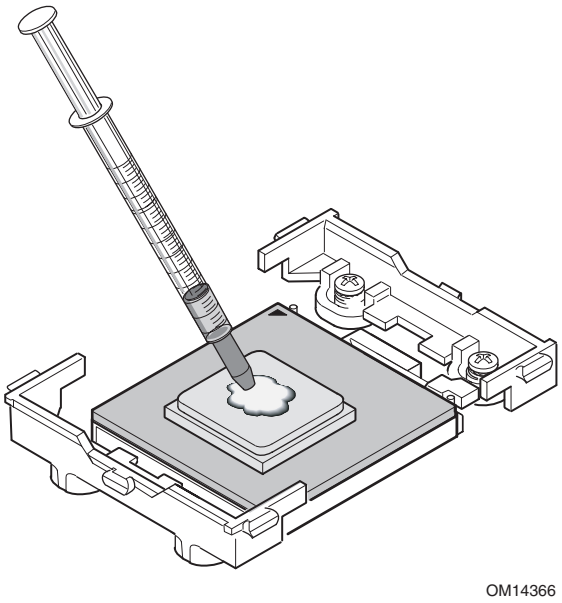


Figure 29. Applying Thermal Grease

8. Align the heat sink with the retention brackets and place heat sink on the processor.

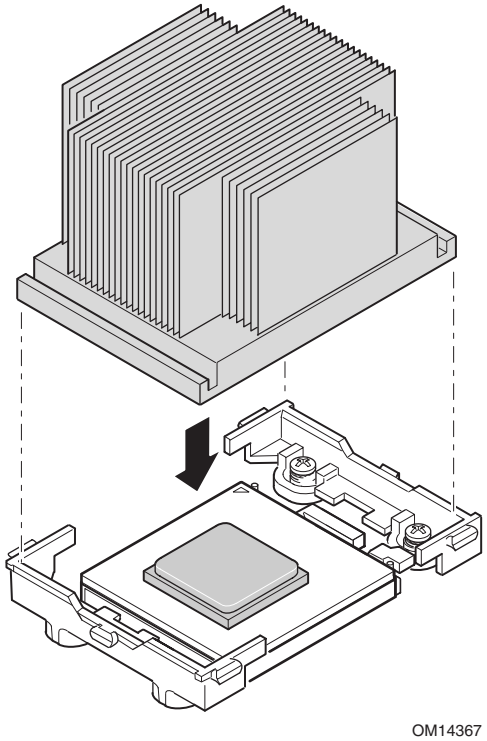


Figure 30. Aligning the Heat Sink

9. Position the retention clip over the plastic tab and engage the retention clip end-slot over the plastic tab (see 1 in Figure 31). Note that the slot in the clip provides room for side-to-side motion while engaging the retention clip slots located at each end.
10. Press downward on the retention clip ends over the plastic tabs on the retention bracket (see 2 in Figure 31).
11. Install two retention clips on each processor you install.

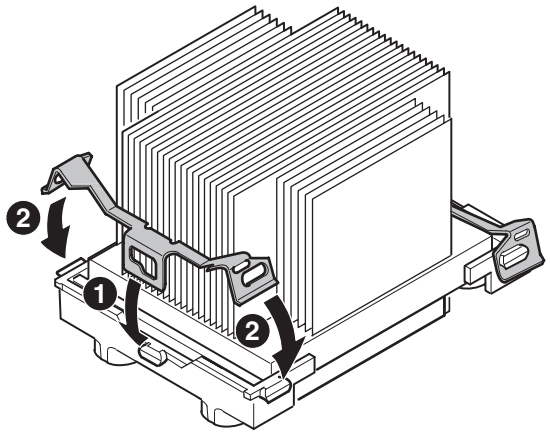


Figure 31. Attaching the Heat Sink and Retention Clip

Installing the Processor Wind Tunnel

The following instructions apply to the Intel SC5200 Base Server Chassis and reference chassis installations. If you are installing your server board in the Intel SC5200 Hot-Swap, Redundant Power Server Chassis, DO NOT install the processor wind tunnel. The ducting in the Intel SC5200 Hot-Swap, Redundant Power Server Chassis eliminates the need for a processor wind tunnel.

1. Install processor wind tunnel center section over the heat sink / processor assembly. Note that plastic tabs engage the tabs on the retention clips.

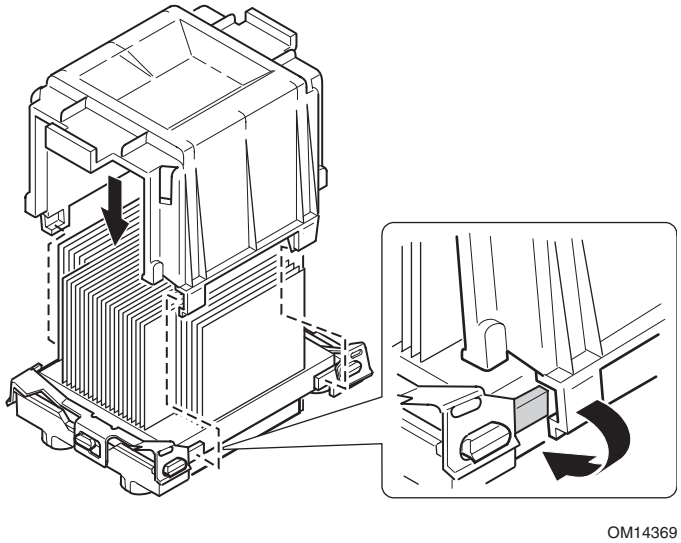


Figure 32. Attaching the Wind Tunnel Assembly

2. Attach the processor wind tunnel fan to the wind tunnel air intake assembly as shown. The fan label must be pointing into the air intake assembly.

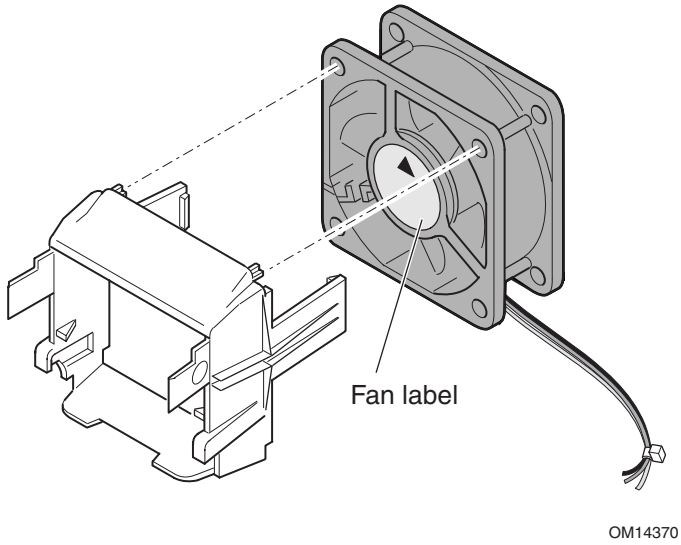


Figure 33. Attaching the Heat Sink Fan to the Air Intake Assembly

⚠ CAUTION

To ensure proper system cooling, the heat sink fan must be installed as shown in Figure 34 and the air intake fan assembly must be attached to the side of the processor / wind tunnel assembly nearest to the front of the chassis.

3. Attach the air intake fan assembly to the side of the heat sink wind tunnel closest to the front of the chassis.
   a. Press both sides of the air intake section to bend tabs inward (see 1 in Figure 34).
   b. Insert tabs into slots on the wind tunnel center section (see 2 in Figure 34).
   c. Press the air intake section downward to engage the assembly (see 3 in Figure 34).

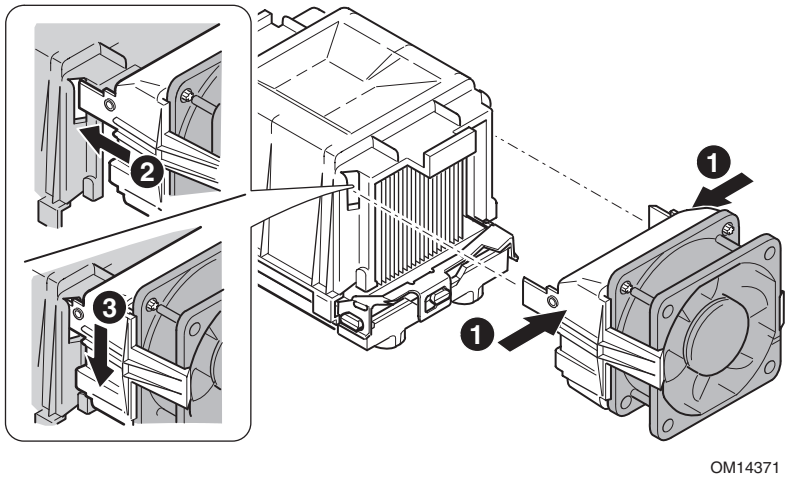


Figure 34. Attaching the Wind Tunnel Intake and Exhaust

4. Attach the air exhaust fan assembly to the heat sink wind tunnel.
   a. Press both sides of the air exhaust section to bend tabs inward (see 1 in Figure 35).
   b. Insert tabs into slots on the wind tunnel center section (see 2 in Figure 35).
   c. Press the air intake section downward to engage the assembly (see 3 in Figure 35).

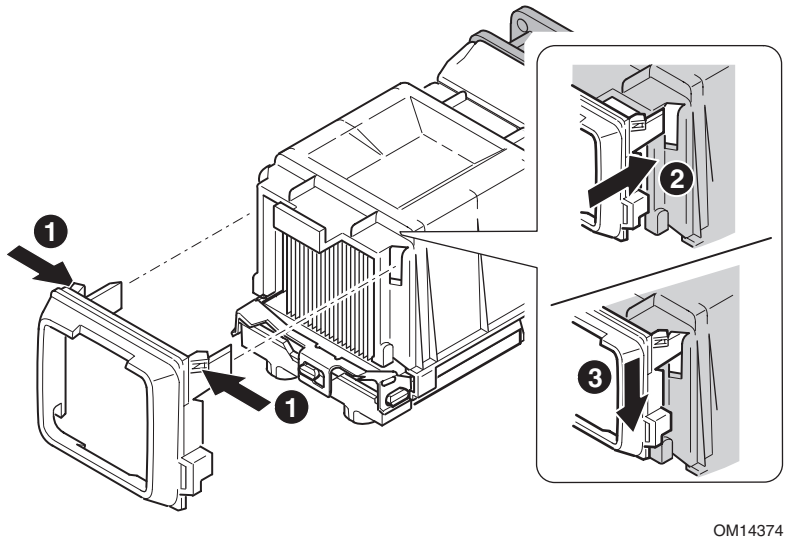


Figure 35. Attaching the Wind Tunnel Intake and Exhaust

5. Attach CPU Fan cable(s). See "Making Connections to the Server Board" on page 35 for fan connector location information.

Removing a Processor

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional cautions given here.
2. Unplug the heat sink fan.
3. Detach the processor wind tunnel, if attached to the heat sink.
4. Detach the heat sink clip from the processor socket. See the documentation that shipped with your processor for more detail.
5. Remove the heat sink from the processor.
6. Raise the locking bar on the socket.
7. Remove the processor from the socket.

Replacing the Backup Battery

The lithium battery on the server board powers the RTC for up to 10 years in the absence of power. When the battery starts to weaken, it loses voltage, and the server settings stored in CMOS RAM in the RTC (for example, the date and time) may be wrong. Contact your customer service representative or dealer for a list of approved devices.

⚠ WARNING

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

⚠ ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

⚠ ADVARSEL

Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

⚠ VARNING

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

⚠ VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Open the chassis.
3. Insert the tip of a small flat-blade screwdriver, or equivalent, under the tab in the plastic retainer. Gently push down on the screwdriver to lift the battery.
4. Remove the battery from its socket.
5. Dispose of the battery according to local ordinance.
6. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.
7. Close the chassis.
8. Run BIOS Setup to restore the configuration settings to the RTC.

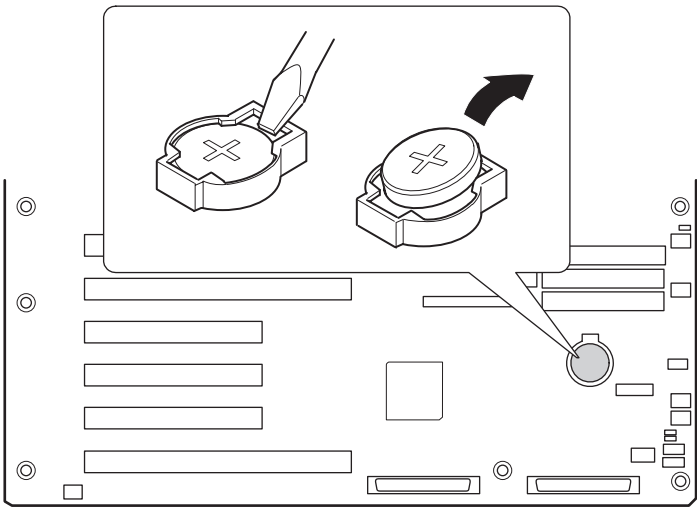


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Figure 36. Replacing the Back up Battery

4 Configuration Software and Utilities

This chapter describes the Power-On Self-Test (POST) and server configuration utilities. The table below briefly describes the utilities.

Table 4. Configuration Utilities

Utility	Description	Page
BIOS Setup	Used for modifying server board set features, including setting time, date, and system passwords; setting the boot device priority; configuring the diskette drive and serial ports; and enabling the SCSI BIOS and system management features.	57
System Setup Utility (SSU)	Used for viewing and clearing the system event log, viewing the system management FRU information, or viewing the system management SDR repository.	58
FRUSDR Load Utility	Used for updating the Field Replacement Unit (FRU), Sensor Data Record (SDR), and SM BIOS (SMB) flash components.	69
BIOS Upgrade Utility	Used to upgrade the BIOS.	73
Firmware Update Utility	Used to update the Firmware.	76
Adaptec SCSI Utility	Used to configure or view the settings of the SCSI host adapters and onboard SCSI devices in the server.	78

Hot Keys

Use the keyboard's numeric pad to enter numbers and symbols.

Table 5. Hot Keys

To do this:	Press these keys
Clear memory and reload the operating system - this is a system reset.	<Ctrl+Alt+Del>
Secure your system immediately.	<Ctrl+Alt>+hot key (Set your hot key combination with Setup.)

Power-On Self-Test (POST)

Each time you turn on the system, POST starts running. POST checks the server board, processor, memory, keyboard, and most installed peripheral devices. During the memory test, POST displays the amount of memory that it is able to access and test. The length of time needed to test memory depends on the amount of memory installed. POST is stored in flash memory.

1. Turn on your video monitor and server. After a few seconds POST begins to run.
2. After the memory test, these screen prompts and messages appear:

   ```
   Press <F2> to enter SETUP
   ```

3. If you do not press <F2> and do NOT have a device with an operating system loaded, the above message remains for a few seconds while the boot process continues, and the system beeps once. Then this message appears:

   ```
   Operating system not found
   ```

   If you do not press <F2> and DO have an operating system loaded, the boot process continues, and this message appears:

   ```
   Press <Ctrl><A> to enter SCSI Utility
   ```

4. Press <Ctrl+A> if there are SCSI devices installed. When the utility opens, follow the displayed instructions to configure the onboard SCSI host adapter settings and to run the SCSI utilities. Also see "Using the Adaptec SCSI Utility" on page 78. If you do not enter the SCSI utility, the boot process continues.
5. Press <Esc> during POST to pop up a boot menu when POST finishes. From this menu you can choose the boot device or enter BIOS Setup.

After POST completes, the system beeps once.

What appears on the screen after this depends on whether you have an operating system loaded and if so, which one.

If the system halts before POST completes running, it emits a beep code indicating a fatal system error that requires immediate attention. If POST can display a message on the video display screen, it causes the speaker to beep twice as the message appears.

Note the screen display and write down the beep code you hear; this information is useful for your service representative. For a listing of beep codes and error messages that POST can generate, see the "Monitoring POST" on page 81.

Using BIOS Setup

This section describes the BIOS Setup options. Use Setup to change the server configuration defaults. You can run Setup with or without an operating system being present. Setup stores most of the configuration values in battery backed CMOS; the rest of the values are stored in flash memory. The values take effect when you boot the server. POST uses these values to configure the hardware; if the values and the actual hardware do not agree, POST generates an error message. You must then run Setup to specify the correct configuration.

Record Your Setup Settings

Record your setup settings on a worksheet. If the default values ever need to be restored (after a CMOS clear, for example), you must run Setup again. Referring to the worksheet could make your task easier.

If You Cannot Access Setup

If the diskette drive is misconfigured so that you cannot access it to run a utility from a diskette, you may need to clear CMOS memory. You will need to open the server, change a jumper setting, use Setup to check and set diskette drive options, and change the jumper back. For a step-by-step procedure, see Chapter 5, under the heading, "CMOS Jumper."

Starting Setup

You can enter and start Setup under several conditions:

- When you turn on the server, after POST completes the memory test
- When you reboot the server by pressing <Ctrl+Alt+Del> while at the DOS operating system prompt
- When you have moved the CMOS jumper on the server board to the "Clear CMOS" position (enabled); for the procedure, see "Server Board Jumpers" on Page 89.

In the three conditions listed above, after rebooting, you will see this prompt:

```
Press <F2> to enter SETUP
```

NOTE

If the BIOS setup option "POST Diagnostic Screen" is enabled (Default), you will not see the message "Press <F2> to enter SETUP." This message is hidden by the Manufacturer's Splash screen. To see the message, press the <ESC> key while the splash screen is displayed. This will temporarily disable the splash screen allowing you to see the message.

In a fourth condition, when CMOS/NVRAM has been corrupted, you will see other prompts but not the <F2> prompt:

```
Warning:  cmos checksum invalid
Warning:  cmos time and date not set
```

In this condition, the BIOS will load default values for CMOS and attempt to boot.

Using the System Setup Utility

The System Setup Utility (SSU) is located on the *Intel Server Board SHG2 Resource* CD-ROM shipped with the server.

Run the System Setup Utility to:

- Set boot device priority
- Set passwords and security options
- View system events
- View FRU information
- View sensor data records
- Update system firmware and BIOS
- Save and restore the system configuration
- Set up the server to send alerts for platform events
- Set up the server for remote management

You can specify the boot device sequence and set up system passwords and security options using either the System Setup Utility or BIOS Setup (page 57). Both utilities access the same stored configuration data for these items, and the result of making a change to these settings using either utility is identical.

The SSU consists of a collection of task-oriented modules plugged into a common framework called the Application Framework (AF). The Application Framework provides a launching point for individual tasks and a location for setting customization information.

Creating SSU Diskettes

You can run the SSU directly from the Utilities menu of the System Resource CD-ROM, from a set of DOS diskettes, or from the service partition of the hard disk.

If you choose to run the SSU from a set of DOS diskettes, you must create the SSU diskettes from the Resource CD-ROM as follows:

1. Boot to the System Resource CD-ROM.
2. Choose **Create Diskettes > Create Diskettes by Device/Function > System Setup Utility**.
3. Follow the instructions displayed.

Alternatively, if you have a workstation with the Microsoft Windows operating system, you can insert the CD into that system and create the diskettes on that system.

Running the SSU

When the SSU starts in the default local execution mode, the SSU accepts input from the keyboard or mouse. The SSU presents a VGA-based GUI on the primary monitor.

If you run the SSU from read-only media, such as the CD-ROM, you cannot save user preference settings (such as screen colors).

The SSU supports ROM-DOS version 6.22. The SSU will not operate from a "DOS box" running under an operating system such as Windows.

To start the SSU:

1. Start the SSU using one of the following methods:
   - **From diskettes:** Insert the first SSU diskette in drive A and boot the server from the diskette. You are prompted to insert the second diskette. After loading completes the SSU starts automatically.
   - **From the System Resource or ISM CD-ROM:** Boot the server to the System Resource CD and start the SSU from the Utilities menu.
   - **From the Service Partition:** Boot the server to the Service Partition and execute the following DOS commands:

     ```
     C:\>  cd ssu

     C:\SSU>  ssu.bat
     ```
2. The mouse driver loads if it is available; press **Enter** to continue.
3. When the SSU title appears on the screen, press **Enter** to continue.

Working with the GUI

You can access features of the GUI using the mouse or keyboard:

- **Mouse**—Click once to choose menu items and buttons or to select items in a list, such as the Available Tasks list. To run a list item, such as one of from the Available Tasks list, select the item and click OK or double-click the item.
- **Keyboard**—Use the tab and arrow keys to highlight buttons and press the spacebar or <Enter> to execute. You can also execute a menu or button by using the <Alt> key in combination with the underlined letter in the name of the menu or button.

You can have more than one task open at the same time, although some tasks might require complete control to avoid possible conflicts. The tasks achieve complete control by keeping the task as the center of operation until you close the task window.

The SSU has a build-in help system, which you access by clicking a Help button or choosing the Help menu.

Customizing the SSU Interface

The SSU lets you customize your interface using the Preferences section of the main window. The SSU sets these preferences and saves them in the AF.INI file so that they take effect the next time you start the SSU. There are four user customizable settings:

- **Color -** lets you change the default colors associated with different items on the screen using predefined color combinations. The color changes take effect immediately.
- **Mode -** lets you set the desired expertise level: novice, intermediate, or expert.

  The expertise level determines which tasks are visible in the Available Tasks section and which actions each task performs. For a new mode setting to take effect, you must exit the SSU and restart it.
- **Language -** lets you change the text in the SSU to the appropriate language. For a new language setting to take effect, you must exit the SSU and restart it.
- **Other -** lets you show or hide the status bar at the bottom of the SSU main window. The change takes effect immediately.

NOTE

If you run the SSU from read-only media (CD-ROM, for example), these preferences are lost when you exit the SSU.

Exiting the SSU

Exiting the SSU closes all SSU windows.

Setting Boot Device Priority

To change the boot priority of a device:

1. From the SSU Main window, choose **Boot Devices**.
2. In the Multiboot Options Add-in window, select a device.
3. Click the **Move Up** button to move it up in the list. Click the **Move Down** button to move it down.

Setting Passwords and Security Options

You can set a user password and an admin password. On some systems, you must set an admin password before you can set a user password. On other systems, the passwords are independent. You can set the same passwords and security options by using BIOS Setup (page 57).

Setting the Admin Password

The Admin Password button lets you set or change the admin password used by both the SSU and the system BIOS. This option is not available if both an admin and a user password are set and you entered only the user password when you started the SSU. All changes to the admin password take effect immediately.

To change or clear the administrator password:

1. From the SSU Main window, choose **Security**.
2. Click the **Admin Password** button.
3. If you are changing passwords, enter the old password.
4. Enter the new password (or leave blank to clear).
5. Confirm the password by entering it again (or leave blank to clear).
6. Click **OK** to save the password and return to the Security window.

Setting the User Password

The User Password button lets you set or change the user password used by both the SSU and the system BIOS. All changes to the user password take effect immediately.

To change or clear the user password:

1. From the SSU Main window, choose **Security**.
2. Click the **User Password** button.
3. If you are changing passwords, enter the old password in the first box.
4. Enter the new password (or leave blank to clear).
5. Confirm the password by entering it again (or leave blank to clear).
6. Click **OK** to save the password and return to the Security window.

Setting Security Options

For a description of security features, see page 19.

To set the security options:

1. In the Security window, click the **Options** button.
2. For each option, select the desired setting from the list. The options are:
   - **Security Hot Key**: The key combination that can be used to put the server into secure mode.
   - **Secure Mode Timer**: If no keyboard or mouse activity occurs during the chosen time interval, the server enters secure mode.
   - **Secure Mode Boot**: Enable forces the server to boot directly into secure mode.
   - **Video Blanking**: Enable turns off the video when the server is in secure mode.
   - **Floppy Write**: Enable prevents writing to the diskette drive while the server is in secure mode.
   - **Power Switch Inhibit**: Enable prevents the power and reset buttons from functioning when the server is in secure mode. Disable allows the power and reset buttons to function normally when the server is in secure mode.
3. Click **Save** to save the settings and return to the Security window.

Viewing the System Event Log

To view the System Event Log (SEL):

1. From the SSU Main window, choose **SEL Manager**.

   When you start the SEL Manager, it automatically loads the current list of events from non-volatile memory.
2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the File and SEL menu items to work with the SEL information:
   - **Open**: Views data from a previously saved SEL file.
   - **Save As**: Saves the currently loaded SEL data to a file.
   - **Properties**: Displays information about the SEL.
   - **Clear SEL**: Clears the SEL data from the nonvolatile storage area.
   - **Reload**: Refreshes the display by reading the current SEL entries from the server.
   - **Sort By**: Sorts the displayed events by event number, time stamp, sensor type and number, event description, or event generator ID.

Viewing FRU Information

To view the Field Replaceable Unit (FRU) information:

1. From the SSU Main window, choose **FRU Manager**.

   When you start the FRU Manager, it automatically loads the current list of events from non-volatile memory.

   The FRU Manager window has a navigation pane on the left that displays, in a tree format, the inventory of components in the server. The tree has three categories: Chassis, Board, and Product. Clicking on a category expands or collapses a list of components for that category. Clicking on an individual component displays the FRU information for that component in the presentation pane in the upper right. The description pane in the lower right displays a description of the currently selected FRU area.
2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the File and FRU menu items to work with the FRU information:
   - **Open**: Views data from a previously saved FRU file.
   - **Save As**: Saves the currently loaded FRU data to a file.
   - **Properties**: Displays the number of FRU devices in the system and the number being displayed. Only FRU devices with valid FRU areas are displayed.
   - **Reload**: Refreshes the display by reading the current FRU entries from the server.

Viewing Sensor Data Records

To view the Sensor Data Records (SDR):

1. From the SSU Main window, choose **SDR Manager**.

   When you start the SDR Manager, it automatically loads the SDR entries from non-volatile memory.

   The SDR Manager window has a navigation pane on the left that displays, in a tree format, the sensor data records. The tree has categories for each type of record. Clicking on a category expands or collapses a list of SDRs for that category. Clicking on an individual SDR displays the information for that SDR in the presentation pane in the upper right. The description pane in the lower right displays a description of the currently selected SDR type.
2. Use the <F4> and <F5> keys to scroll the window contents to the left and right to view all of the columns.
3. Use the File and SDR menu items to work with the SDR information:
   - **Open**: Views data from a previously saved SDR file.
   - **Save As**: Saves the currently loaded SDR data to a file.
   - **Properties**: Displays information about the SDR, including IPMI version, number of SDR entries, time stamps for changes to the SDR information, and free space remaining.
   - **Reload**: Refreshes the display by reading the SDR data from the server.

Updating System Firmware and BIOS

Using the SSU, you can update the BIOS, update the firmware, and verify the firmware. Procedures for each are given below. You can also update the BIOS and firmware without using the SSU (see page 74). You can download the updates from the Intel support website:

http://support.intel.com/support/motherboards/server/SHG2

Updating the BIOS

To update the BIOS:

1. Download the update from the Intel support website.
2. From the SSU Main window, choose System Update. (System Update is available only in Expert mode.)

   When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
3. From the **File** menu, choose **Load** and choose a .uif or .bio file to use for the update.
4. Click the **Update** button to update the BIOS.

Updating the Firmware

To update the system firmware:

1. Download the update from the Intel support website.
2. From the SSU Main window, choose **System Update**. (System Update is available only in Expert mode.)
3. When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
4. From the **File** menu, choose **Load** and choose a .uif or .hex file to use for the update.
5. Click the **Update** button to perform the update.

Verifying the Firmware

To compare the system firmware in nonvolatile memory with a firmware file:

1. Download the update from the Intel support website.
2. From the SSU Main window, choose **System Update**. (System Update is available only in Expert mode.)

   When you start System Update, it automatically displays the current revision information for the system firmware and BIOS.
3. From the **File** menu, choose **Load** and choose a .hex file to use for the update.
4. Click the **Verify** button to compare the firmware code in nonvolatile storage with the selected file.

Saving and Restoring the System Configuration

Using the SSU, you can save the following configuration information to a file:

- Platform type, BIOS revision, and firmware revision
- CMOS settings
- Extended system configuration data (ESCD)
- Settings for the emergency management port (EMP), platform event paging (PEP), and BMC LAN alerts

Data is saved from all sources. There is no way to choose only certain pieces of configuration data to save. You can also restore the information from a saved configuration file.

NOTE

BIOS passwords are stored in the file. Restoring a configuration can change passwords on a server. EMP and LAN passwords are not stored in the file.

Saving a Configuration

To save the system configuration:

1. From the SSU Main window, choose **Config Save/Restore**. (Configuration Save/Restore is available only in Expert mode.)
2. Click **Save To File** and specify a filename and location.

Restoring a Configuration

To restore the system configuration from a file:

1. From the SSU Main window, choose **Config Save/Restore**. (Configuration Save/Restore is available only in Expert mode.)
2. Click **Restore from File** and specify a filename and location.

The CSR reads the platform type, BIOS revision, and firmware revision from the file and compares that information with the same information retrieved from the server. If the two do not match, an error message is displayed and the restore operation aborts. If they do match, the CSR restores the configuration data to the server. It prompts you to reboot the server for the new settings to take effect.

Alerting for Platform Events

You can set up the server to alert you when various events occur. Alerts can be delivered either as telephone pages, over the LAN, or by email.

Setting Up Email Alerts

You can receive email alerts for any of the same events supported by LAN alert or Platform Events Paging. Unlike LAN Alert and Platform Events Paging that can be configured using the SSU, you must use the Intel Server Management Platform Interface Control (PIC) software to configure an email address to receive alerts.

For more information on installing Intel Server Management (ISM) software, see page 40. For more information on configuring email alerts using the PIC, see the Installation & User Guide located on the ISM CD-ROM.

Setting Up Paging Alerts

To set up the server to send alerts as telephone pages:

1. Install an external modem on the Emergency Management Port (COM2).
2. From the SSU Main window, choose **Platform Event Manager (PEM)**.
3. In the PEM window, click **Configure EMP**.
4. In the corresponding boxes, enter the following command strings for the modem attached to the EMP port:
   - **ESC Sequence**: the escape sequence. This string is sent to the modem before sending command strings. The maximum string length is five characters; longer strings are truncated.
   - **Hangup String**: hang up or drop the connection. The EMP automatically sends an <ENTER> character following this string. The maximum string length is eight characters; longer strings are truncated.
   - **Modem Dial Command**: the command to dial a phone number. This string is sent to the modem before sending the paging string.
   - **Modem Init String**: the initialization string for the modem. This string is sent every time the EMP initializes. The maximum length for the string is determined at run-time from firmware. You will be notified if the string is truncated. Following a save, the actual string saved is displayed in the edit box.

5. Click **Save** to save the changes.
6. Click **Close** to return to the PEM window.
7. In the PEM window, click **Configure PEP**.
8. Select the **Enable PEP** check box.
9. In the **Blackout Period** box, enter the minimum time, in minutes, between successive pages. The valid range is [0 - 255] where 0 disables the blackout period. Setting a blackout period can save you from being flooded with repeat pages. After you receive a PEP page, no additional pages are sent by PEP for the duration of the blackout period.
10. In the **Paging String** box, enter the phone number to dial for the page and the message you want sent with the page. The maximum length for the paging string is determined at run-time from firmware. You will be notified if the string is truncated. Following a save, the actual string saved is displayed in the edit box.
11. From the **Options** menu, choose **Configure Event Actions**.
12. In the Platform Event Paging Actions window, move the events that you want to generate an alert to the Enabled column and move all other events to the disabled column using the following buttons:
    - >>: Moves all events from the enabled list to the disabled list.
    - >: Moves the selected event from the enabled list to the disabled list.
    - <: Moves the selected event from the disabled list to enabled the list.
    - <<: Moves all events from the disabled list to the enabled list.
13. Click **Save** to save the changes.
14. Click **Close** to return to the PEP Configuration window.
15. To send a test page to verify that you have correctly configured PEP, from the **Options** menu, choose **Send Alert**.
16. Click **Save** to save the configuration.
17. Click **Close** to return to the Platform Event Manager window.

Setting Up LAN Alerts

To set up the server to send alerts over the LAN:

1. Configure the remote system to receive alerts. For more information, see the documentation for Intel Server Management software.
2. From the SSU Main window, choose Platform Event Manager (PEM).
3. In the PEM window, click **Configure LAN**.
4. Select the **Enable LAN Alerts** check box.
5. (Optional) In the **SNMP Community String** box, enter a string for the community field in the Header section of the SNMP trap sent for an alert. The string must be from 5 to 16 characters. The default string is *public*.
6. In the **IP Setup** box, choose either:
    - **DHCP**: the IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
    - **Static**: assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.

7. If you chose Static IP Setup in the previous step, fill in the IP addressing boxes:
   - **Host IP Address**: the IP address of this server.
   - **Gateway IP Address**: the IP address of the router for this server.
   - **Subnet Mask**: the IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.
8. In the **Alert IP Address** box, fill in the IP address of the system you want to receive alerts from this server. If you want the alert to be broadcast to an entire subnet, enter the IP address for the subnet.
9. From the **Options** menu, choose **Configure Event Actions**.
10. In the BMC LAN Alerting Actions window, move the events that you want to generate an alert to the Enabled column and move all other events to the disabled column using the following buttons:
    - >>: Moves all events from the enabled list to the disabled list.
    - >: Moves the selected event from the enabled list to the disabled list.
    - <: Moves the selected event from the disabled list to enabled the list.
    - <<: Moves all events from the disabled list to the enabled list.
11. Click **Save** to save the changes.
12. Click **Close** to return to the BMC LAN Configuration window.
13. To send a test alert to verify that you have correctly configured BMC LAN alerts, from the **Options** menu, choose **Send Alert**.
14. Click **Save** to save the changes.
15. Click **Close** to return to the PEM window.

Managing the Server Remotely

You can set up the server to so that you can connect to it from a remote client system to perform management tasks. You can make the connection over a LAN or by using a modem or direct serial cable to the Emergency Management Port (EMP). Instructions for setting up the server for remote LAN and serial/modem access are given below.

Setting Up Remote LAN Access

To configure remote LAN access:

1. From the SSU Main window, choose **Platform Event Manager (PEM)**.
2. In the PEM window, click **Configure LAN**.
3. If you want to require a password for remote access, enter the password in the **Enter New Password** box and in the **Verify New Password** box. Passwords can be from 1 to 16 characters long, using any ASCII character in the range [32-126]. To clear the passwords, leave both boxes blank. (You can also clear the password by choose the menu Options > Clear LAN Password.)
4. From the **LAN Access Mode** list, select the remote access mode:
   - **Full Access**: a remote system can initiate a LAN connection regardless of the state or health of the server.

- **Restricted**: a remote system can initiate a LAN connection, but cannot perform control operations such as power down, reset, or front panel NMI.
- **Disabled**: remote systems are not allowed to initiate LAN connections.

5. In the **IP Setup** box, choose either:
   - **DHCP**: the IP address for the server is automatically assigned by the DHCP (dynamic host control protocol) server on the network. The Host, Gateway, and Subnet Mask boxes in the dialog are ignored.
   - **Static**: assign the IP address for the server using the Host, Gateway, and Subnet Mask boxes in the dialog.
6. If you chose Static IP Setup in the previous step, fill in the IP addressing boxes:
   - **Host IP Address**: the IP address of this server.
   - **Gateway IP Address**: the IP address of the router for this server.
   - **Subnet Mask**: the IP address for the server's subnet. The server uses this to decide if the alert destination is on the same subnet.
7. Click **Save** to save the changes.
8. Click **Close** to return to the PEM window.

Setting Up Remote Modem or Serial Access

To configure remote modem or serial access:

1. From the SSU Main window, choose **Platform Event Manager (PEM)**.
2. In the PEM window, click **Configure EMP**.
3. If you want to require a password for remote access, enter the password in the **Enter New Password** box and in the **Verify New Password** box. Passwords can be from 1 to 16 characters long, using any ASCII character in the range [32-126]. To clear the passwords, leave both boxes blank. (You can also clear the password by choose the menu Options > Clear LAN Password.)
4. In the **Modem Ring Time** box, enter the number of 500ms intervals that the BMC should wait before taking control of the COM2 port and answering an incoming call. A value greater than zero gives the BIOS time to answer before the BMC takes control. A value of zero causes the BMC to answer immediately. The maximum value, 63, tells the BMC to ignore the call. Modem Ring Time applies only to Preboot access mode and is ignored for other access modes.
5. In the **System Phone Number** box, enter the number for the phone line connected to the modem on the EMP.
6. From the **Access Mode** list, choose the remote access mode:
   - **Always Active**: the EMP is available at any time.
   - **Preboot**: the EMP is available only when the server is powered down or is in the running POST during startup.
   - **Disabled**: remote systems are not allowed to initiate connections.
7. From the **Restricted Mode** list, choose either:
   - **Enabled**: a remote system can initiate a connection, but cannot perform control operations such as power down, reset, or front panel NMI.
   - **Disabled**: the remote system has full control of the server.

8. From the **Connection Mode** list, choose either:
   - **Direct Connect**: the COM2 port on the server is connected by a serial cable to the remote system.
   - **Modem Connect**: the COM2 port on the server is connected to a modem.
9. Click **Save** to save the changes.
10. Click **Close** to return to the PEM window.

FRUSDR Load Utility

The Field Replacement Unit (FRU) and Sensor Data Record (SDR) Load Utility is a DOS-based program used to update the server management subsystem's product level FRU, SDR, and the SM BIOS (SMB) nonvolatile storage components (EEPROMs). The load utility

- Discovers the product configuration based on instructions in a master configuration file
- Displays the FRU information
- Updates the nonvolatile storage device (EEPROM) associated with the Baseboard Management Controller (BMC) that holds the SDR and FRU area
- Updates the SMB area located in the BIOS nonvolatile storage device
- Generically handles FRU devices that may not be associated with the BMC

When to Run the FRUSDR Load Utility

You should run the FRUSDR Load Utility each time you upgrade or replace the hardware in your server, excluding add-in boards, hard drives, and RAM. For example, if you replace an array of fans, you need to run the utility. It programs the sensors that need to be monitored for server management.

Because the firmware must reload to properly initialize the sensors after programming, turn the server off and remove the AC power cords from the server. Wait approximately 30 seconds, and reconnect the power cords.

What You Need to Do

The FRUSDR Load Utility may be run directly from the Configuration Software CD or from a diskette you create from the CD. It can be extracted from the CD by booting to the CD and selecting "Make Diskettes" or by inserting the CD into a PC running Windows 95 or later and selecting the "Utilities" section.

NOTE

If your diskette drive is disabled, or improperly configured, you must use BIOS Setup to enable it. If necessary, you can disable the drive after you are done with the FRUSDR utility.

How You Use the FRUSDR Load Utility

This utility is compatible with ROM-DOS Ver. 6.22, MS-DOS† Ver. 6.22, and later versions. The utility accepts CFG, SDR and FRU load files. The executable file for the utility is frusdr.exe. The utility requires the following supporting files:

- One or more .fru files describing the system's field replaceable units
- A .cfg file describing the system configuration
- A .sdr file describing the sensors in the system

Command Line Format

The basic command line format is

```
frusdr [/?] [/h] [/d {smb, fru, sdr}] [/cfg filename.cfg] /p
```

Command	Description
frusdr	Is the name of the utility
/? or /h	Displays usage information
/d {smb, fru, sdr}	Only displays requested area
/cfg filename.cfg	Uses custom CFG file
/p	Pause between blocks of data

Parsing the Command Line

The FRUSDR Load Utility allows only one command line function at a time. A command line function may consist of two parameters; for example, cfg filename.cfg. Any invalid parameters result in displaying an error message and exiting the program. You can use either a slash (/) or a minus sign (-) to specify command line options. The /p flag may be used in conjunction with any of the other options.

Displaying Usage Information

When the utility is run with the /? or /h command line flags, the following message is displayed:

```
FRU & SDR Load Utility Version X.XX

Usage:   frusdr               Is the name of the utility.
         /? Or /h             Displays usage information.
         /d {smb,fru,sdr}     Only displays requested area.
         /cfg filename.cfg    Uses custom CFG file.
         /p                   Pause between blocks of data.
```

Displaying a Given Area

When the utility is run with the /d SMB, /d FRU, or /d SDR command line flag, the indicated area is displayed. Each area represents a sensor; one sensor for each instrumented device in the server. If the given display function fails because of an inability to parse the data present or a hardware failure, the utility displays an error message and exits.

Displaying SM BIOS Area

The SM BIOS area is displayed in ASCII format when the field is ASCII or as a number when the field is a number. Each SM BIOS area displayed is headed with the SM BIOS area designated name. Each field has a field name header followed by the field in ASCII or as a number.

Displaying FRU Area

The FRU area is displayed in ASCII format when the field is ASCII or as a number when the field is a number. Each FRU area displayed is headed with the FRU area designated name. Each field has a field name header followed by the field in ASCII or as a number. The Board, Chassis, and Product FRU areas end with an END OF FIELDS CODE that indicates there is no more data in this area. The Internal Use area is displayed in hex format, 16 bytes per line.

Displaying SDR Area

The SDR nonvolatile storage area is displayed in the following hex format. The data is separated by a Sensor Record Number X header, where X is the number of that sensor record in the SDR area. The next line after the header is the sensor record data in hex format delineated by spaces. Each line holds up to 16 bytes. The data on each line is followed by the same data in ASCII format; nonprintable characters are substituted by a period (.).

Using Specified CFG File

The utility can be run with the command line parameter of **-**cfg filename.cfg. The filename can be any DOS accepted, eight-character filename string. The utility loads the specified CFG file and uses the entries in the configuration file to probe the hardware and to select the proper SDRs to load into nonvolatile storage.

Displaying Utility Title and Version

The utility displays its title:

```
FRU & SDR Load Utility, Version X.XX
```

Where X.XX is the revision number for the utility.

Configuration File

The configuration file is in ASCII text. The utility executes commands formed by the strings present in the configuration file. These commands cause the utility to perform various tasks needed to ultimately load the proper SDRs into the nonvolatile storage of the BMC and possibly generic FRU devices. Some of the commands may be interactive and require you to make a choice.

Prompting for Product Level FRU Information

Through the use of a Configuration File, the utility may prompt you for FRU information.

Filtering Sensor Data Record From the SDR File

The MASTER.SDR file has all the possible SDRs for the system. These records may need to be filtered based on the current product configuration. The configuration file directs the filtering of the SDRs.

Updating the SDR Nonvolatile Storage Area

After the utility validates the header area of the supplied SDR file, it updates the SDR repository area. Before programming, the utility clears the SDR repository area. The SDR file is loaded via the .cfg File. Then the utility filters all tagged SDRs depending on the product configuration set in the Configuration File. Nontagged SDRs are automatically programmed. The utility also copies all written SDRs to the SDR.TMP file. It contains an image of what was loaded, and the TMP file is also useful for debugging the server.

Updating FRU Nonvolatile Storage Area

After the configuration is determined, the utility updates the FRU nonvolatile storage area. First it verifies the Common Header area and checksum from the specified FRU file. The Internal Use Area is read out of the specified .FRU file and is programmed into the nonvolatile storage. The Chassis, Board, Product and MultiRecord areas are read out of the specified .FRU file, if they exist, then those areas are programmed into the FRU nonvolatile storage. All the areas are also written to the FRU.TMP file, which is useful for debugging the server.

Updating SMB FRU Nonvolatile Storage Area

After programming the BMC FRU area, the corresponding SMB fields are automatically updated when the server is re-booted.

Cleaning Up and Exiting

If an update was successfully performed, the utility displays an appropriate message and then exits with a DOS exit code of zero.

If the utility fails, it immediately exits with an error message and a non-zero DOS exit code.

Upgrading the BIOS

Preparing for the Upgrade

Before you upgrade the BIOS, prepare for the upgrade by recording the current BIOS settings, obtaining the upgrade utility, and making a copy of the current BIOS.

Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:

   ```
   Press <F2> to enter SETUP
   ```

2. Write down the current settings in the BIOS Setup program.

NOTE

Do not skip step 2. You will need these settings to configure your computer at the end of the procedure.

Obtaining the Upgrade Utility

You can upgrade to a new version of the BIOS using the new BIOS files and the BIOS upgrade utility, iFLASH.EXE. You can obtain the BIOS upgrade file and the iFLASH.EXE utility through your computer supplier or from the Intel Customer Support website:

http://support.intel.com/support/motherboards/server/SHG2

NOTE

Please review the instructions distributed with the upgrade utility before attempting a BIOS upgrade.

This upgrade utility allows you to:

- Upgrade the BIOS in flash memory
- Update the language section of the BIOS

The following steps explain how to upgrade the BIOS.

Creating a Bootable Diskette

1. Use a DOS system to create the diskette or boot the server to the System Resource CD and "Quit to DOS".
2. Insert a diskette in diskette drive A.
3. At the C:\ prompt, for an unformatted diskette, type:

   ```
   format a:/s
   ```

   or, for a formatted diskette, type:

   ```
   sys a:
   ```

4. Press <Enter>

Creating the BIOS Upgrade Diskette

The BIOS upgrade file is a compressed self-extracting archive that contains the files you need to upgrade the BIOS.

1. Insert the bootable diskette into the diskette drive.
2. Extract the contents of the BIOS.EXE file onto the bootable diskette. To do this, read the instructions distributed with the BIOS package.

Upgrading the BIOS

1. Place the bootable diskette containing the BIOS update files into the diskette drive of your system. Boot the system with the diskette is in the drive.
2. At this point you have a choice of two options. Press **1** and **ENTER** to automatically update the system BIOS. This will update the system BIOS and reset the system. Press **2** and **ENTER** to update the User Binary and reset the system.
3. Wait while the BIOS files are updated. Do **not** power down the system during the BIOS update process! The system will reset automatically when the BIOS update process is completed. Remove the diskette from the diskette drive.
4. Check to make sure the BIOS version displayed during POST is the new version as the system reboots.
5. Enter Setup by pressing the **F2** key during boot. Once in Setup, press **F9** and **ENTER** to set the parameters back to default values.
6. Re-enter the values you wrote down at the beginning of this process. Press **F10** and **ENTER** to exit BIOS Setup and Save Changes.
7. If you do not set the CMOS values back to defaults using the **F9** key, the system may function erratically.

NOTE

You may encounter a CMOS Checksum error or other problem after reboot. Try shutting down the system and booting up again. CMOS checksum errors require that you enter Setup, check your settings, save your settings, and exit Setup.

Recovering the BIOS

It is unlikely that anything will interrupt the BIOS upgrade; however, if an interruption occurs, the BIOS could be damaged. The following steps explain how to recover the BIOS if an upgrade fails.

In the event of BIOS corruption, the following procedure may be used to perform a BIOS recovery boot.

1. Prepare a bootable floppy diskette containing the BIOS recovery files for the *SHG2* server board obtained from Intel's web sites.
2. Power off the system, unplug the power cord, and remove the chassis cover.
3. Add a jumper on CN43 pins 9-10 (BIOS recovery).
4. Insert the BIOS Recovery floppy diskette into the disk drive.
5. Reinstall the chassis' cover, plug in the power cord(s), and power on the system.
6. The screen will remain blank while the BIOS Recovery is performed. At the end of the BIOS Recovery, two high-pitched beeps will sound and the floppy drive access light will turn off. The BIOS Recovery may take several minutes to complete. When the BIOS Recovery is complete, it is safe to power off the system.
7. Power off the system, unplug the power cord(s), and remove the chassis cover.
8. Remove the BIOS Recovery jumper from CN43 pins 9-10.
9. Replace the chassis' cover, plug in the power cord(s), and power on the system.

Changing the BIOS Language

You can use the BIOS upgrade utility to change the language the BIOS uses for messages and the Setup program. Use a bootable diskette containing the Intel flash utility and language files.

1. Boot the computer with the bootable diskette in drive A. The BIOS upgrade utility screen appears.
2. Select `Update Flash Memory From a File`.
3. Select `Update Language Set`. Press <Enter>.
4. Select drive A and use the arrow keys to select the correct `.lng` file. Press <Enter>.
5. When the utility asks for confirmation that you want to flash the new language into memory, select `Continue with Programming`. Press <Enter>.
6. When the utility displays the message `upgrade is complete`, remove the diskette. Press <Enter>.
7. The computer will reboot and the changes will take effect.

Using the Firmware Update Utility

The Firmware Update Utility is a DOS-based program used to update the Baseboard Management Controller's firmware code. You only need to run the Firmware Update Utility if new firmware code becomes necessary or the firmware becomes corrupted. It is highly recommended that you also update the FRU/SDR files at the same time that you update the BMC Firmware.

You can obtain the latest version of the firmware update file from the Intel Customer Support website:

http://support.intel.com/support/motherboards/server/SHG2

Making a BMC Firmware Update Diskette

1. Place a formatted diskette into the diskette drive.
2. Extract the contents of the *SHG2* firmware file onto the diskette.

Making the Update Diskette Bootable

1. Use a DOS system to create the diskette or boot the server to the System Resource CD and "Quit to DOS".
2. Insert the update diskette into diskette drive A.
   At the C:\ prompt, type:
   ```
   sys a:
   ```
3. Press <Enter>

Updating the BMC Firmware

In the event of a release of an updated BMC Firmware, the following procedure may be used to update the firmware.

NOTE

These instructions for BMC Update are a general guideline. Please follow the specific instructions described in the release notes.

1. Prepare a bootable floppy diskette containing the updated BMC firmware files for the *SHG2* Server Board obtained from:

   http://support.intel.com/support/motherboards/server/SHG2
2. Insert the BMC Firmware floppy diskette into the disk drive.
3. Reboot the system. BMC Firmware update occurs automatically and may take several minutes to complete. When the BMC Firmware update is complete, it is safe to power off the system.
4. Power off the system and remove the power cord for 30 seconds.
5. Connect the power cord and power on the system.

Recovering the BMC Firmware

In the event of BMC Firmware corruption, the following procedure may be used to perform a BMC Firmware recovery boot.

1. Prepare a bootable floppy diskette containing the updated BMC firmware files for the *SHG2* Server Board obtained from Intel's Customer Support web site.
2. Power off the system, unplug the power cord, and remove the chassis cover.
3. Add a jumper on CN47 pins 1-2 (BMC Force Update).
4. Insert the BMC Firmware floppy diskette into the disk drive.
5. Reinstall the chassis' cover, plug in the power cord(s), and power on the system.
   BMC Firmware update occurs automatically and may take several minutes to complete. When the BMC Firmware update is complete, it is safe to power off the system.
6. Power off the system, unplug the power cord(s), and remove the chassis' cover.
7. Remove the BMC Force Update jumper from CN47 pins 1-2. Place it on pins 11-12 of jumper CN 43 for future use.
8. Replace the chassis' cover and plug in the power cord(s).
9. Wait 30 seconds after connecting the power cord in order to allow the BMC firmware to load.
10. Power on the system.

Updating the FRU/SDR Files

You can obtain the latest version of the FRU/SDR update files from the Intel Customer Support website:

http://support.intel.com/support/motherboards/server/SHG2

Making a FRU/SDR File Update Diskette

1. Place a formatted diskette in the diskette drive.
2. Extract the contents of the *SHG2* FRU/SDR file onto the diskette.

Making the Update Diskette Bootable

1. Use a DOS or Windows 95 system to create the bootable diskette.
2. Insert a diskette in diskette drive A.
   At the C:\ prompt, type:
   sys a:
3. Press <Enter>

Updating the FRU/SDR Files

1. Place the diskette containing the FRU/SDR update files into the diskette drive of your system. Boot the system while the diskette is in the drive.
2. Follow the instructions that appear on the screen.

Using the Adaptec SCSI Utility

The Adaptec SCSI utility detects the SCSI host adapters on the server board. The utility runs out of BIOS and is used to:

- Change default values
- Check and/or change SCSI device settings that may conflict with those of other devices in the server

Running the SCSI Utility

1. When this message appears on the video monitor:

   ```
   Press Ctrl-A to run SCSI Utility...
   ```

2. Press <Ctrl+A> to run this utility. When it appears, choose the host adapter that you want to configure.

5 Solving Problems

This chapter helps you identify and solve problems that might occur while you are using the system.

Resetting the System

To do this:	Press:
Soft boot reset, which clears system memory and reloads the operating system.	<Ctrl+Alt+Del>
Clear system memory, restart POST, and reload the operating system.	Reset button
Cold boot reset. Turn the system power off and then on. This clears system memory, restarts POST, reloads the operating system, and halts power to all peripherals.	Power off/on

Initial System Startup

Problems that occur at initial system startup are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause.

Checklist

- ❑ Are the power supplies turned on? Check the switches on the back of the chassis.
- ❑ Are all cables correctly connected and secured?
- ❑ Are the processors fully seated in their slots on the server board?
- ❑ Are all add-in PCI boards fully seated in their slots on the server board?
- ❑ Are all jumper settings on the server board correct?
- ❑ Are all jumper and switch settings on add-in boards and peripheral devices correct? To check these settings, refer to the manufacturer's documentation that comes with them. If applicable, ensure that there are no conflicts—for example, two add-in boards sharing the same interrupt.
- ❑ Are all DIMMs installed correctly?
- ❑ Are all peripheral devices installed correctly?
- ❑ If the system has a hard disk drive, is it properly formatted or configured?
- ❑ Are all device drivers properly installed?
- ❑ Are the configuration settings made in BIOS Setup correct?
- ❑ Is the operating system properly loaded? Refer to the operating system documentation.
- ❑ Did you press the system power on/off switch on the front panel to turn the server on (power on light should be lit)?
- ❑ Is the system power cord properly connected to the system and plugged into a NEMA 5-15R outlet for 100-120 V~ or a NEMA 6-15R outlet for 200-240 V~?
- ❑ Is AC power available at the wall outlet?
- ❑ Are all integrated components from the tested components lists? Check the tested memory, and chassis lists, as well as the supported hardware and operating system list on the Intel Customer Support website.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly.

Checklist

- ❑ Does the system meet the minimum hardware requirements for the software? See the software documentation.
- ❑ Is the software an authorized copy? If not, get one; unauthorized copies often do not work.
- ❑ If you are running the software from a diskette, is it a good copy?
- ❑ If you are running the software from a CD-ROM disk, is the disk scratched or dirty?
- ❑ If you are running the software from a hard disk drive, is the software correctly installed? Were all necessary procedures followed and files installed?
- ❑ Are the correct device drivers installed?
- ❑ Is the software correctly configured for the system?
- ❑ Are you using the software correctly?

If the problems persist, contact the software vendor's customer service representative.

After the System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly may indicate equipment failure. Many situations that are easy to correct, however, can also cause such problems.

Checklist

- ❑ If you are running the software from a diskette, try a new copy of the software.
- ❑ If you are running the software from a CD-ROM disk, try a different disk to see if the problem occurs on all disks.
- ❑ If you are running the software from a hard disk drive, try running it from a diskette. If the software runs correctly, there may be a problem with the copy on the hard disk drive. Reinstall the software on the hard disk, and try running it again. Make sure all necessary files are installed.
- ❑ If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- ❑ If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. (Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.)

NOTE

Random errors in data files: If you are getting random errors in your data files, they may be getting corrupted by voltage spikes on your power line. If you are experiencing any of the above symptoms that might indicate voltage spikes on the power line, you may want to install a surge suppressor between the power outlet and the system power cord.

More Problem Solving Procedures

This section provides a more detailed approach to identifying a problem and locating its source.

Preparing the System for Diagnostic Testing

⚠ CAUTION

Turn off devices before disconnecting cables: Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

1. Turn off the system and all external peripheral devices. Disconnect all of them from the system, except the keyboard and video monitor.
2. Make sure the system power cord is plugged into a properly grounded AC outlet.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two thirds of their maximum ranges (see the documentation supplied with your video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
5. Turn on the system. If the power LED does not light, see “Power Light Does Not Light” on page 82.

Monitoring POST

The server may start to beep while booting. These beeps identify system events. The following gives a description of possible beep codes.

Table 6. Beep Codes

Beep Code	Description
1	One short beep before boot (this is normal, not an error)
1-2	Search for option ROMs. One long, two short beeps on checksum failure
1-2-2-3	BIOS ROM checksum
1-3-1-1	Test DRAM refresh
1-3-1-3	Test 8742 Keyboard Controller
1-3-3-1	Auto size DRAM, system BIOS stops execution here if the BIOS does not detect any usable memory DIMMs
1-3-4-1	Base RAM failure; BIOS stops execution here if entire memory is bad
2-1-2-3	Check ROM copyright notice
2-2-3-1	Test for unexpected interrupts

For additional information regarding monitoring POST, see Chapter 4.

Verifying Proper Operation of Key System Lights

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity light should turn on briefly. Check for the following:

- ❑ Does the diskette drive activity light turn on briefly? If not, see "Diskette Drive Activity Light Does Not Light" on page 84.
- ❑ If a second diskette drive is installed, does its activity light turn on briefly? If not, see "Diskette Drive Activity Light Does Not Light" on page 84.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, see "Initial System Startup" on page 79.

Specific Problems and Corrective Actions

This section provides possible solutions for these specific problems:

- Power light does not light
- There is no beep or an incorrect beep pattern
- No characters appear on screen
- Characters on the screen appear distorted or incorrect
- System cooling fans do not rotate
- Diskette drive activity light does not light
- CD-ROM drive activity light does not light
- There are problems with application software
- The bootable CD-ROM is not detected

Try the solutions in the order given. If you cannot correct the problem, contact your service representative or authorized dealer for help.

Power Light Does Not Light

Check the following:

- ❑ Is the system operating normally? If so, the power LED may be defective or the cable from the front panel to the server board is loose.
- ❑ Are there other problems with the system? If so, check the items listed under "System Cooling Fans Do Not Rotate Properly".

If all items are correct and problems persist, contact your service representative or authorized dealer for help.

No Characters Appear on Screen

Check the following:

- ❑ Is the keyboard functioning? Check to see that the "Num Lock" light is functioning.
- ❑ Is the video monitor plugged in and turned on?
- ❑ Are the brightness and contrast controls on the video monitor properly adjusted?
- ❑ Are the video monitor switch settings correct?
- ❑ Is the video monitor signal cable properly installed?
- ❑ Is the onboard video controller enabled?

If you are using an add-in video controller board, do the following:

1. Verify that the video controller board is fully seated in the server board connector.
2. Reboot the system for changes to take effect.
3. If there are still no characters on the screen after you reboot the system and POST emits a beep code, write down the beep code you hear. This information is useful for your service representative.
4. If you do not receive a beep code and characters do not appear, the video display monitor or video controller may have failed. Contact your service representative or authorized dealer for help.

Characters Are Distorted or Incorrect

Check the following:

- ❑ Are the brightness and contrast controls properly adjusted on the video monitor? See the manufacturer's documentation.
- ❑ Are the video monitor signal and power cables properly installed?

If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your service representative or authorized dealer for help.

System Cooling Fans Do Not Rotate Properly

If the system cooling fans are not operating properly, system components could be damaged.

Check the following:

- ❑ Is AC power available at the wall outlet?
- ❑ Is the system power cord properly connected to the system and the wall outlet?
- ❑ Did you press the power button?
- ❑ Is the power on light lit?
- ❑ Have any of the fan motors stopped (use the server management subsystem to check the fan status)?
- ❑ Are the fan power connectors properly connected to the server board?
- ❑ Is the cable from the front panel board connected to the server board?
- ❑ Are the power supply cables properly connected to the server board?
- ❑ Are there any shorted wires caused by pinched cables or power connector plugs forced into power connector sockets the wrong way?

If the switches and connections are correct and AC power is available at the wall outlet, contact your service representative or authorized dealer for help.

Diskette Drive Activity Light Does Not Light

Check the following:

- ❑ Are the diskette drive's power and signal cables properly installed?
- ❑ Are all relevant switches and jumpers on the diskette drive set correctly?
- ❑ Is the diskette drive properly configured?
- ❑ Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.

If you are using the onboard diskette controller, use the Setup Utility to make sure that "Onboard Floppy" is set to "Enabled". If you are using an add-in diskette controller, make sure that "Onboard Floppy" is set to "Disabled".

If the problem persists, there may be a problem with the diskette drive, server board, or drive signal cable. Contact your service representative or authorized dealer for help.

Hard Disk Drive Activity Light Does Not Light

The hard disk drive activity light is not connected to the SHG2 server board.

CD-ROM Drive Activity Light Does Not Light

Check the following:

- ❑ Are the CD-ROM drive's power and signal cables properly installed?
- ❑ Are all relevant switches and jumpers on the drive set correctly?
- ❑ Is the drive properly configured?
- ❑ Is the onboard IDE controller enabled?

Cannot Connect to a Server

- ❑ Make sure you are using the drivers that are shipped on the system Configuration Software CD for the onboard network controller.
- ❑ Make sure the driver is loaded and the protocols are bound.
- ❑ Make sure the network cable is securely attached to the connector at the system back panel. If the cable is attached but the problem persists, try a different cable.
- ❑ Make sure the hub port is configured for the same duplex mode as the network controller.
- ❑ Check with your LAN administrator about the correct networking software that needs to be installed.
- ❑ If you are directly connecting two servers (no hub), you will need a crossover cable (see your hub documentation for more information on crossover cables).
- ❑ Check the network controller LEDs that are visible through an opening at the system back panel.

Problems with Network

The server hangs when the drivers are loaded.

- ❑ Change the PCI BIOS interrupt settings. Try the "PCI Installation Tips" below.

Diagnostics pass, but the connection fails.

- ❑ Make sure the network cable is securely attached.
- ❑ Make sure you specify the correct frame type in your NET.CFG file.

The controller stopped working when an add-in adapter was installed.

- ❑ Make sure the cable is connected to the port from the onboard network controller.
- ❑ Make sure your PCI BIOS is current. Try the "PCI Installation Tips" below.
- ❑ Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts.
- ❑ Try reseating the add in adapter.

The add-in adapter stopped working without apparent cause.

- ❑ Try reseating the adapter first; then try a different slot if necessary.
- ❑ The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- ❑ Run the diagnostics.

PCI Installation Tips

Some common PCI tips are listed here.

- Certain drivers may require interrupts that are not shared with other PCI drivers. The SSU can be used to adjust the interrupt numbers for PCI devices. For certain drivers, it may be necessary to alter settings so that interrupts are not shared.

Problems with Application Software

If you have problems with application software, do the following:

- Verify that the software is properly configured for the system. See the software installation and operation documentation for instructions on setting up and using the software.
- Try a different copy of the software to see if the problem is with the copy you are using.
- Make sure all cables are installed correctly.
- Verify that the server board jumpers are set correctly. See Chapter 5.
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problem persists, contact the software vendor's customer service representative for help.

Bootable CD-ROM Is Not Detected

Check the following:

- Is the BIOS set to allow the CD-ROM to be the first bootable device?

6 Getting Help

World Wide Web

http://support.intel.com/support/motherboards/server/SHG2

Telephone

All calls are billed US $25.00 per incident, levied in local currency at the applicable credit card exchange rate plus applicable taxes.

In U.S. and Canada	1-800-404-2284		
In Europe			
UK	0870 6072439	Finland	9 693 79297
France	01 41 918529	Denmark	38 487077
Germany	069 9509 6099	Norway	23 1620 50
Italy	02 696 33276	Sweden	08 445 1251
Spain	91 377 8166	Holland	020 487 4562
In Asia-Pacific region			
Australia	1800 649931	Indonesian	001-803 65 7249
Hong Kong	852 2 844 4456	Malaysia	1-800 80 1390
Korea	822 767 2595	New Zealand	0800 444 365
PRC	800 820 1100	Pakistan	632 6368415
Singapore	65 831-1311	Philippines	1-800 1 651 0117
Taiwan	2 2718 9915	Thailand	001-800 6310003
India	0006517-2-830 3634	Vietnam	632 6368416
In Japan			
0120-868686 (Domestic)		81-298-47-0800 (outside country)	
In Latin America			
Brazil	0021-0811-408-5540	Ecuador	999-119, 800-628-8686 (via AT&T)
Mexico	001-800-628-8686	Guatemala	99-99-190, 800-628-8686 (via AT&T)
Colombia	980-9-122-118	Venezuela	800-11-120, 800-628-8686 (via AT&T)
Costa Rica	0-800-011-0395	Argentina	001-800-222-1001, 800-628-8686 (via AT&T)
Panama	001-800-628-8686	Paraguay	008-11, 800-628-8686 (via AT&T)
Chile	800-532-992	Peru	0-800-50000, 800-628-8686 (via AT&T)
Miami	1-800-621-8423	Uruguay	000-410, 800-628-8686 (via AT&T)

7 Technical Reference

Server Board Jumpers

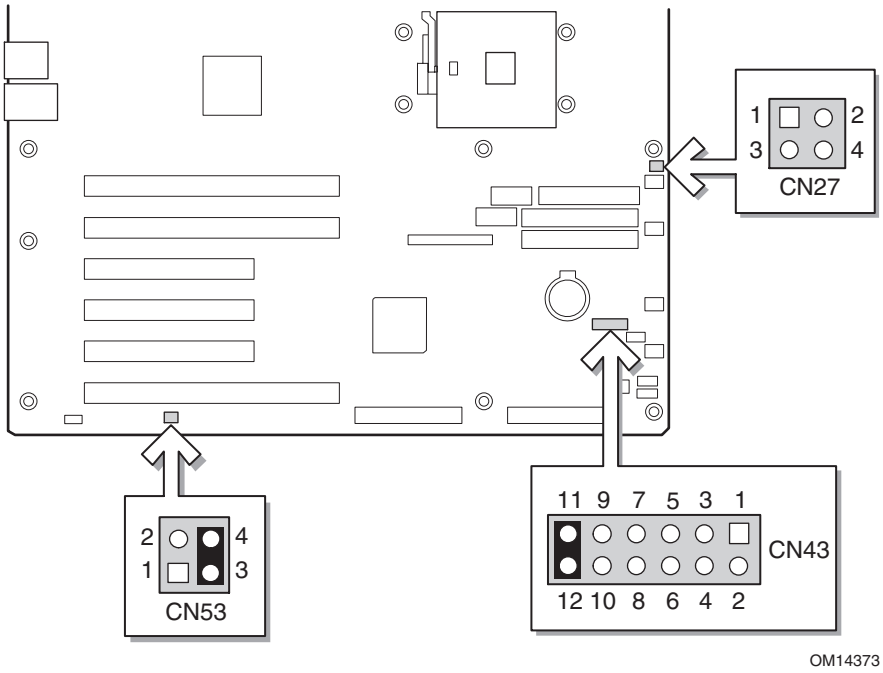

Figure 37. Jumper Locations

Table 7. Configuration Jumper (CN43)

Jumper Name	Pins	What it does at system reset
CMOS clear	1-2	If these pins are jumpered, the CMOS settings will be cleared on the next reset. These pins should **not** be jumpered for normal operation.
Password Clear	3-4	If these pins are jumpered, the password will be cleared on the next reset. These pins should **not** be jumpered for normal operation.
Reserved	5-6	Reserved. These pins should **not** be jumpered for normal operation.
Reserved	7-8	Reserved. These pins should **not** be jumpered for normal operation.
BIOS Recovery	9-10	If these pins are jumpered, the BIOS will attempt a recovery boot, loading BIOS code from a floppy diskette into the Flash device. This is typically used when the BIOS code has been corrupted. These pins should **not** be jumpered for normal operation.
SPARE	11-12	SPARE jumper.

Table 8. Configuration Jumper (CN27)

Jumper Name	Pins	What it does at system reset
BIOS Write Protect	1-2	If these pins are jumpered, write protect is disabled allowing the BIOS boot block to be updated. This feature is used in the rare case that a BIOS update requires a BIOS boot block update as well. These pins should **not** be jumpered for normal operation.
BMC Write Protect	3-4	If these pins are jumpered, write protect is disabled allowing the BMC boot block to be updated. This feature is used in the rare case that a BIOS update requires a BMC boot block update as well. These pins should **not** be jumpered for normal operation.

Table 9. Configuration Jumper (CN53)

Jumper Name	Pins	What it does at system reset
PCIX1 DIS	1-2	Placing a jumper on pins 1-2 disables the 100 MHz PCI-X mode for the CIOBX2 primary channel and forces the bus to run 66 MHz PCI. The primary channel consists of Slot 1, Slot 2 and Gbit. In the default configuration, pins 1-2 are **not** jumpered therefore the primary channel is configured for 100 MHz PCI-X.
PCIX2 DIS	3-4	Placing a jumper on pins 3-4 disables the PCI-X mode for the CIOBX2 secondary channel and forces the bus to run 66 MHz PCI. The secondary channel consists of Slot 6 and the on-board SCSI. In the default configuration, pins 3-4 **are** jumpered therefore the secondary channel is configured for 66 MHz PCI and on-board SCSI is enabled.

Enabling PCI-X on Slot 6 and Disabling On-board SCSI

✏ NOTE

Enabling the 133 MHz PCI-X on Slot 6 disables the on-board SCSI.

To enable the 133 MHz PCI-X on Slot 6, follow these instructions:

1. Enter BIOS setup.
2. While in BIOS setup, remove the jumper from CN53 pins 3-4.
3. In BIOS setup disable the on-board SCSI.
4. Select Save & Exit BIOS setup.
5. While the system is posting, shutdown the system by pushing the front panel power button.
6. While the system in off, plug a PCI-X card into Slot 6.
7. Push the front panel power button to power up the system.
8. Slot 6 is now 133 MHz PCI-X capable.

8 Regulatory and Integration Information

Product Regulatory Compliance

Product Safety Compliance

The *SHG2* complies with the following safety requirements:

- UL 1950 - CSA 950 (US/Canada)
- EN 60 950 (European Union)
- IEC60 950 (International)
- CE – Low Voltage Directive (73/23/EEC) (European Union)
- EMKO-TSE (74-SEC) 207/94 (Nordics)
- GOST R 50377-92 (Russia)

Product EMC Compliance

The SHG2 has been has been tested and verified to comply with the following electromagnetic compatibility (EMC) regulations when installed a compatible Intel host system. For information on compatible host system(s) refer to Intel's Server Builder website or contact your local Intel representative.

- FCC (Class A Verification) – Radiated & Conducted Emissions (USA)
- ICES-003 (Class A) – Radiated & Conducted Emissions (Canada)
- CISPR 22, 3rd Edition (Class A) – Radiated & Conducted Emissions (International)
- EN55022 (Class A) – Radiated & Conducted Emissions (European Union)
- EN55024 (Immunity) (European Union)
- CE – EMC Directive (89/336/EEC) (European Union)
- VCCI (Class A) – Radiated & Conducted Emissions (Japan)
- AS/NZS 3548 (Class A) – Radiated & Conducted Emissions (Australia / New Zealand)
- RRL (Class A) Radiated & Conducted Emissions (Korea)
- BSMI (Class A) Radiated & Conducted Emissions (Taiwan)
- GOST R 29216-91 (Class A) Radiated & Conducted Emissions (Russia)
- GOST R 50628-95 (Immunity) (Russia)

Product Regulatory Compliance Markings

This product is marked with the following Product Certification Markings:

UL Recognition Mark	
CE Mark	
Russian GOST Mark	
Australian C-Tick Mark	
BSMI DOC Marking	
BSMI EMC Warning	警告使用者： 這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策
RRL MIC Mark	

Electromagnetic Compatibility Notices

FCC (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions related to the EMC performance of this product, contact:

Intel Corporation
5200 N.E. Elam Young Parkway
Hillsboro, OR 97124
1-800-628-8686

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. The customer is responsible for ensuring compliance of the modified product.

Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC Class A or B limits may be attached to this computer product. Operation with noncompliant peripherals is likely to result in interference to radio and TV reception.

All cables used to connect to peripherals must be shielded and grounded. Operation with cables, connected to peripherals, that are not shielded and grounded may result in interference to radio and TV reception.

INDUSTRY CANADA (ICES-003)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled: "Digital Apparatus," ICES-003 of the Canadian Department of Communications.

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le material brouilleur: "Apparelis Numériques", NMB-003 édictee par le Ministre Canadian des Communications.

Europe (CE Declaration of Conformity)

This product has been tested in accordance too, and complies with the Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance.

Taiwan Declaration of Conformity

This product has been tested and complies with CNS13438. The product has been marked with the BSMI DOC mark to illustrate compliance.

Korean RRL Compliance

This product has been tested and complies with MIC Notices No. 1997-41 and 1997-42. The product has been marked with the MIC logo to illustrate compliance.

1. 기기의 명칭(모델명) :
2. 인증번호 :
3. 인증받은 자의 상호 :
4. 제조년월일:
5. 제조자/제조국가 :

The English translation for the above is as follows:
1. Type of Equipment (Model Name): SHG2
2. Certification No.: Contact Intel Representative
3. Name of Certification Recipient: Intel
4. Date of Manufacturer: Marked on Product
5. Manufacturer / Nation : Intel

Australia / New Zealand

This product has been tested and complies with AS/NZS 3548. The product has been marked with the C-Tick mark to illustrate compliance.

9 Equipment Log Worksheet

Equipment Log

Use the blank equipment log provided here to record information about your system. You will need some of this information when you run the SSU.

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
System			
Server Board			
Primary Processor Speed and Cache			
Secondary Processor Speed and Cache			
Video Display			
Keyboard			
Mouse			
Diskette Drive A			
Diskette Drive B			
Tape Drive			
CD-ROM Drive			
Hard Disk Drive 1			
Hard Disk Drive 2			
Hard Disk Drive 3			
Hard Disk Drive 4			
Hard Disk Drive 5			

continued

Equipment Log (continued)

Item	Manufacturer Name and Model Number	Serial Number	Date Installed

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